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# FOREST SERVICE HEALTH and SAFETY CODE

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F76H  
1962



YOUR  
GUIDE  
TO  
SAFE  
PRACTICES



UNITED STATES DEPARTMENT OF AGRICULTURE





## A PERSONAL MESSAGE TO EACH MEMBER OF THE FOREST SERVICE

This revision of the Health and Safety Code represents the latest thinking on the safe way to do our Forest Service job. Use it carefully when starting new jobs, and refer to it often on present jobs. Then, many of the accidents that needn't happen won't happen.

But this is only part of the story. Rules, regulations, and guides will only go just so far towards preventing injury. The big gain in safety must come from how you and I feel personally towards stopping accidents. This means not only consciously being on the alert for hazards but to subconsciously recognize them even while we're thinking about something else. What I'm saying is that safety must be second nature if we are going to get the job done without hurting somebody.

Finally, that there be no doubt, I want to make it absolutely clear that it is Forest Service policy, and my policy, for safety to come first, even before production on any job--regular or emergency. It should never be said that time or job demands didn't allow for doing the job safely.

*Edward P. Cliff*

EDWARD P. CLIFF, Chief

Revised August 1962



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# CHAPTER

# 1

## Policy and Administration



Policy



Contracts



Accident Investigation

### LEGEND

CAPITALIZED TEXT - - somebody was killed by not observing these practices.

SHALL - - denotes a mandatory requirement.

The SHALL's are capitalized for easy reference.

SHOULD - - denotes a recommended practice.

It is the duty of each of us to prevent accidents - and to protect himself and others from injury



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## 1.1 POLICY (FSM 6181)

### 1.11 GENERAL

(1) Accident prevention SHALL be undertaken as a definite, aggressive, continuing part of every activity. The active support and participation of our entire personnel SHALL be enlisted.



(2) The policies and procedures in the Forest Service Health and Safety Code SHALL be fully enforced on all jobs.

(3) Accident prevention and safety code compliance SHALL take precedence over immediate job production, with SAFETY ALWAYS FIRST.

(4) Every reasonable facility of our own and other organizations SHALL be used to carry out the policy of integrating safety into all work planning, training, inspection, and execution.

(5) Good safety performance SHALL be acknowledged by suitable recognition and awards, depending on the merits of each case.

(6) Responsibility SHALL be fixed for all preventable accidents, and discipline SHALL be administered if warranted.



1.11(7)

1.11 (7) The policies and principles in the First Aid Guide SHALL be observed at all times. The following steps SHALL be taken with seriously injured persons:

- a. Examine victims thoroughly.
- b. Treat, in this order, immediately.

SERIOUS BLEEDING

STOPPAGE OF BREATH

POISONING

SHOCKS--Keep victim lying down. Maintain body heat.

- c. Send for help. Get doctor or ambulance. Alert hospital if necessary.

(8) All Forest Service handbooks SHALL include specific safe practices for all their activities, which supplement the Safety Code.

(9) Wherever applicable, local, state, or nationally recognized safety codes or standards SHALL be used in Forest Service work.

(10) Safe working codes SHALL be developed before new projects are started and new equipment, machines, and work methods used. These codes SHALL be put into effect as soon as enforcement is practicable.



POLICY AND ADMIN.

POLICY

(11) Procurement officers SHALL obtain only equipment and material that is safe to use.

(12) Invitations for bids SHALL advise prospective bidders of the specific safety clauses to be contained in contracts for the protection of Federal employees and the public not otherwise provided for under state or local laws or regulations.

## 1.12 REGIONAL FORESTERS AND DIRECTORS

(1) They SHALL be responsible for implementing the safety policy for their units.

(2) They SHALL designate a Safety Officer to provide leadership, planning, and advisory service coordination, in all safety activities within their units.



(3) Sufficient funds SHALL be allocated to provide the necessary field and clerical assistance as well as promotional materials to assure an acceptable safety program.

(4) Projects SHALL be adequately financed so that jobs do not have to be performed by poorly supervised, inadequate, unskilled employees or with unsafe materials.

(5) Where concentrations of employees or operational hazards exist, safety councils, committees, or other effective means SHALL be provided to--

- a. Advise and recommend on safety programs.
- b. Review injuries and recommend how to prevent recurrences.
- c. Stimulate interest in accident prevention.
- d. Assist in developing better job attitudes and safer work methods.

## 1.13 INSPECTORS

(1) All general and functional inspectors at all levels, including Chief's Office, HSC 1.16 SHALL be required, on their assigned activities, to--

a. Be familiar with the Forest Service Health and Safety Code and check for compliance with it. See responsibility check list.

b. Investigate the effectiveness of accident prevention measures, both for employees and for the general public.

c. Examine employee attitudes, working conditions, and practices to determine hazards.

d. Check on compliance with FSH 1.11(12) accident prevention clauses when included in contracts.

e. State, in inspection reports, ways to make jobs safer and to eliminate hazards to the public. Also give commendations for safety accomplishments.



## 1.14 SUPERVISORY OFFICERS

(1) A person who supervises the work of one or more individuals SHALL be responsible for taking every reasonable precaution to prevent injuries.

(2) Work supervisors SHALL consider employees' safety a basic part of their jobs and SHALL set the example in all safety activities.

(3) The principles of Planned Work Area Protection SHALL be applied to all jobs. These are:

a. Plan your work area, keep it small, and be alert to hazards on adjoining areas.

b. Warn and protect others, including the public, on or near the job.

c. Always use safety devices and equipment.

d. Place SHALL be left in safe condition for others.



(4) Forest officers in immediate charge SHALL issue and review the Health and Safety Code with foremen or superintendents when duties are assigned, and delegate responsibility for compliance. Remember that there is no job so important that it cannot be done safely.

(5) When assigning a job to a foreman or worker, the forest officer SHALL assist in cataloging the job hazards, emphasizing the killer risk or other serious risks involved.

(6) Each foreman and crew leader SHALL take a minimum of 5 minutes each day to discuss with his men a

specific hazard of the day's job. When daily group discussion is not convenient, the foreman SHALL do it at least twice a week. For isolated workers such as guards, a pointed comment or question SHALL be included in ordinary radio or telephone conversations.

**JOB HAZARD ANALYSIS** (suggested)

Project: \_\_\_\_\_

Type of Operation	Tools and Equip.	Hazards	Safe Practices-Devices

1.14(7)

1.14 (7) Supervisory officers and overhead SHALL be responsible for making their projects injury-free. They SHALL--

a. Analyze the hazards and determine the safest way of doing the job. Individual and group training plans SHALL emphasize achieving knowledge and skills in the safety aspects of all activities.

b. Locate and remove unsafe conditions and practices before they cause an accident.

c. When in charge of new men, first check their experience by questions and demonstrations. Work SHALL NOT be started until you have given thorough on-the-job instruction, insisting on safe work methods and pointing out job hazards.

d. Continue instructions as necessary to maintain safe working habits of all workers.

e. Recommend transfer to other kinds of work, discharge, or demotion of workers who cannot or will not follow instructions.

f. Train personnel to identify and eliminate hazards, and to work safely, insisting upon safety-minded attitudes at all times.

g. Anticipate the unexpected and be prepared to meet it.

(8) Supervisory officers SHALL give serious attention to the physical condition of seasonal employees when they return to duty.

(9) Fire fighters SHALL be care- HSC 3.11(1)  
fully screened.





(10) Employees SHALL be placed only in jobs to which they are suited physically and mentally. THOSE WHO REACT SLOWLY OR WHO LACK ALERTNESS SHOULD NOT BE USED ON HAZARDOUS JOBS.

(11) Supervisory officers SHALL appoint special safety officers on projects where numerous or unusual hazards exist, such as on fires.



#### 1.15 INDIVIDUALS

(1) It SHALL be every employee's duty to protect himself and his fellow workers from accidents.

a. Maintain active participation in a continuing program for safe working conditions.

b. Watch for, immediately remove, or report all foreseeable hazards endangering employees or the public, whenever practicable.

c. Learn safe work methods to minimize hazards that cannot be removed.

d. Tactfully call to the attention of fellow workers any unsafe practices or conditions.

e. Study the Health and Safety Code, and ask your boss if you are not sure of safe procedures.

f. Be continually alert to avoid actions endangering the safety of anyone, including yourself.

#### 1.16 ADMINISTRATIVE DIVISIONS SHALL BE PRIMARILY RESPONSIBLE FOR CODE ENFORCEMENT AND FIELD CHECKS AS FOLLOWS:

(1) All Divisions

1.1 Policy

4.3 Off The Job

7.1 Hand Tools Incl. Power

(2) Engineering

2.1 Car Travel

5.4 Roads and Trails

5.7 Wood Preserving

6.1 Blasting

1.16(2) Engineering--  
Cont.

(3) Operation

(4) Timber Management

(5) Fire Control

(6) Recreation and Lands

(7) Range Management

(8) Wildlife Management

(9) Personnel Manage-  
ment

6.3 Concrete and Masonry

6.4 Excavation

6.5 Ladders and Scaffolds

6.6 Rigging

6.7 Welding

7.2 Machine Equipment

7.3 Safety Equipment

8.1 Color Code

8.5 Repair Shops

8.7 Wood and Metal Shops

9.3 Sanitation

1.2 Contracts

3.2 Building Protection

3.3 Flammables

5.8 Radioactive Work

6.2 Radio and Telephone

8.2 Electricity

8.4 Offices and Dwellings

8.6 Warehousing

2.3 Foot Travel

5.2 Forest Project Work

5.3 Sales and Scaling

5.5 Cruising and Surveying

8.3 Laboratories and

Chemicals

2.2 Air Travel

3.1 Fire Fighting

3.4 Lightning

2.5 Water Travel

4.1 Public - General

4.2 Recreation

2.4 Animal Travel

5.6 Fencing

5.1 Firearms

1.3 Accident Investigation

9.1 Health Policy

9.2 Disease Control

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POLICY



1.17 RESEARCH DIVISIONS SHALL BE PRIMARILY RESPONSIBLE FOR CODE ENFORCEMENT AND FIELD CHECKS AS FOLLOWS:

(1) ALL DIVISIONS

- 1.1 Policy
- 4.3 Off-the-Job
- 7.1 Hand Tools Including Power

(2) Station Management

- 1.2 Contracts
- 1.3 Accident Investigations
- 2.1 Car Travel
- 3.2 Building Protection
- 3.3 Flammables
- 5.4 Roads and Trials
- 6.2 Radio and Telephone
- 6.5 Ladders and Scaffolds
- 7.2 Machine Equipment
- 7.3 Safety Equipment
- 8.1 Color Code
- 8.2 Electricity

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|                                     | 8. 3 Labs and Chemicals     |
| (5) Range Management and Recreation | 2. 4 Animal Travel          |
|                                     | 2. 5 Water Travel           |
|                                     | 5. 1 Firearms               |
|                                     | 5. 6 Fencing                |
| (6) Forest Fire Research            | 3. 1 Fire Fighting          |
|                                     | 3. 4 Lightning              |



## 1.2 CONTRACTS

### 1.21 DEVELOPMENT, INSPECTION & ENFORCEMENT

(1) The special accident prevention knowledge and skill of regional, station, and unit safety officers SHALL be fully utilized in developing practical contracts and enforcing them.

(2) Forest officers responsible for contract administration and inspection should be trained in methods of inspecting and SHALL be familiar with all safety clauses in the contract and the proper action to be taken in enforcement.

(3) Consideration SHALL be given to use of full-time or part-time safety officers if the size or difficulty of the job indicates the need to protect the Government and the contractor and their respective employees.

(4) We are not responsible for inspection to assure compliance with applicable provisions of Federal (other than Forest Service) and state laws and regulations, such as those of state industrial or Workmens' Compensation Commissions unless actually included in the contract. We should cooperatively consult with other agencies concerning laws and regulations that they are responsible for administering. Similarly, contractors and permittees should be advised concerning the laws and regulations of other agencies.

## 1.22 GENERAL CLAUSES

(1) A general accident prevention clause SHALL be included in all hazardous work contracts, except for road construction; but including memoranda of a verbal agreement, worded as follows: "In order to protect life and health and to prevent damage in the performance of this contract, the contractor or any of his subcontractors will use due diligence in preventing accidents and shall comply with applicable provisions of Federal and State laws and regulations. The contractor's record of all cases of death, injury, or disease arising out of, or in the course of, employment on work under this contract shall be available upon the call of the contracting officer or his representative."



FSH 6320  
HSC 5.4

(2) Duplicate accident records should not be necessary if reporting is already a State requirement.

## 1.23 SPECIAL CLAUSES

(1) ALL HAZARDOUS WORK CONTRACTS SHALL CONTAIN SPECIAL SAFETY CLAUSES TAILOR MADE TO FIT LOCAL CONDITIONS, IN ORDER TO ADEQUATELY PROTECT OUR PERSONNEL AND THOSE OF THE CONTRACTOR.

(2) Suggested sources are the Forest Service Health and Safety Code, the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc., U.S. Engineers' Safety Requirements, and Forest Service Handbook.



(3) Before work is started under a contract, the contractor and forest officer responsible for contract administration and inspection should arrive at a mutual understanding under the terms of the contract on the elimination or reduction of hazardous conditions and methods to be used to prevent injury to people and damage to property to extent covered by Forest Service authority.

This understanding should be reduced to writing, either in the form of a memorandum or a work order issued by the contracting officer or his designated representatives.







## 1.3 ACCIDENT INVESTIGATION FSH 6181.4

### 1.31 DEFINITION OF AN ACCIDENT

Any unintended occurrence involving operators, equipment, or employees while on official duty resulting in death or injury of employees and/or private citizens, and/or damage to Government or private property.

### 1.32 REPORTING SYSTEMS

(1) There are two general systems for reporting accidents and injuries. One system, explained in FSH 6173, provides the Bureau of Employees' Compensation with the basis for employee benefits under the Federal Employees' Compensation Act. The other system, which is explained in this Code and FSH 6181.4, provides management with information for use in:

- a. Finding basic causes of accidents.
- b. Determining responsibility and liability.
- c. Providing facts for a comprehensive accident prevention program.

(2) Reportable Accident. An accident as defined in Section 1.31 above which must be reported through BEC and/or Forest Service systems.

(3) Chargeable Accident. Accidents SHALL be chargeable under the Forest Service reporting system as follows:

- a. Causes work injury which results in death, permanent total disability, permanent partial disability, or temporary total disability. (These are

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### 1.32(3)a.

used in figuring lost-time injury frequency and severity rates.) Definitions as outlined in this section or in the American Standard Method of Recording and Measuring Work Injury Experience, Z16.1, will be used.

b. Causes (medical) work injury which requires treatment by a medical doctor. (These plus disabling injuries are used for inservice injury frequency computation.)

c. Involves a motor vehicle and results in damage in excess of \$50 to Government vehicle (owned, leased, rented) or employee-owned vehicle used on official business, or damage in any amount to private property.

#### Exceptions--

1. Vehicle properly and legally parked.  
2. Acts of God such as branches blown from trees, lightning, etc.

3. Fire in engine or ignition system.

4. Flying birds, or stones thrown by wheels of other vehicles unless driver loses control of car.

5. Abnormal wear and tear on vehicles used to protect life or property in specific cases, such as tankers used in fighting forest fires where no negligence is involved.

### 1.33 ACCIDENT CLASSES

#### A. WORK INJURY

(1) Fatal - (Death) (Lost Time) - is any fatality resulting from a work injury, regardless of the time intervening between injury and death.

(2) Permanent Total Disability (Lost Time) is any injury other than death which permanently and

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totally incapacitates an employee from following any gainful occupation, or which results in the loss of use or the complete loss of any of the following in one accident:

- a. both eyes
- b. one eye and one hand, or arm, or leg, or foot.
- c. any two of the following not on the same limb: hand, arm, foot, or leg.

(3) Temporary total (Lost Time). Any injury which does not result in death or permanent impairment, but which renders the injured person unable to perform a regularly established job which is open and available to him during the entire time interval corresponding to the hours of his regular shift on any one or more days (including Sundays and holidays) subsequent to the date of injury.



(4) Permanent Partial Disability (Lost Time) is any injury other than death or permanent total disability which results in the complete loss or loss of use of any member or part of a member of the body, or any permanent impairment of functions of the body or part thereof, regardless of any pre-existing disability of the injured member or impaired body function.

The following injuries are not classified as permanent partial disability:

- a. inguinal hernia, if it is repaired--for unrepaired hernia, see Table of Scheduled Charges FSH 6190.
- b. loss of fingernails or toenails
- c. loss of tip of finger without bone involvement
- d. loss of teeth
- e. disfigurement

FSH 6190

1.33(4)f.

1.33 (4) f. strains or sprains which do not cause permanent limitation of motion.

g. simple fractures to the fingers and toes; also such other fractures as do not result in permanent impairment or the restriction of normal function of the injured member.

(5) Temporary partial (medical). An injury which does not result in death, permanent impairment, or temporary total disability, but which requires treatment by a medical doctor.

(6) First aid cases. Minor injuries requiring only treatment by employee or nurse.

(7) Occupational disease (illness). A disease caused by environmental factors, due to exposure which is peculiar to a particular process, trade, or occupation, and to which an employee is not ordinarily subjected or exposed outside of or away from such employment. The disease or illness must not be caused by a primary injury of importance, and the illness must be one in which treatment is primarily medical. FSH 6190

## B. VEHICLE ACCIDENT

(1) A motor vehicle accident is one involving a motor vehicle that results in death, injury to any person, or damage to Government property and private property in any amount regardless of who is at fault. The term motor vehicle includes Government-owned or rented trucks, passenger cars, motorcycles, and employee-owned vehicles used on official business.

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## C. AIRCRAFT ACCIDENTS

(1) An aircraft accident is one involving an aircraft that results in death, or injury to any person, or damage to Government or private property in any amount regardless of who is at fault. The term aircraft includes aircraft owned by the Government or operated by the Government on a mileage, hourly, or leased basis.

## D. PROPERTY DAMAGE, OTHER

(1) Damage sustained in other than motor vehicle or airplane accidents to Government property or privately-owned property involving Government employees.

(2) Damage to Government property due solely to negligence or wrongful act of private parties which does not constitute trespass. FSH 6411.26  
HSC 1.38

## 1.34 ACCIDENT INVESTIGATIONS

(1) All accidents which involve Government employees while on official duty or accidents which can be expected to result in a possible claim against the Government are reportable and SHALL be investigated promptly. The investigation SHALL be made by a team of two or more qualified forest officers for all cases except minor incidents.



(2) A coroner's inquest and an autopsy if for the protection of Government interests SHALL be requested for all accidental deaths on the job. If a special autopsy is requested by the Bureau of Employees' Compensation or Forest Service, an investigating

## 1.34(2)

officer SHALL obtain approval from the responsible dependent legally entitled to the remains.

## 1.35 INVESTIGATING OFFICERS OR TEAM

(1) The investigating team SHALL be well-qualified to make an immediate, thorough, fair and unbiased investigation and report, protecting not only the Government's interest; but also those of private parties. They SHALL NOT permit their loyalty to the Forest Service or its employees to influence them in determining and recording the facts in their recommendations concerning the accident. The official members of the team SHALL be of equal or higher rank than the person being investigated.

(2) All serious injuries or deaths SHALL be investigated by the Regional Forester's or Director's investigating team and headed by an individual not directly connected with the unit involved.

(3) A team from the Chief's Office SHALL investigate accidents where five or more deaths occur.

(4) The investigating team SHALL for all other accidents be designated by the ranking administrative officer on the unit involved.

## 1.36 INVESTIGATION OBJECTIVE AND PURPOSE

(1) To determine the principle and contributing causes of the accident so prompt corrective action can be taken to prevent recurrence and to use findings for developing an effective accident prevention program.

(2) Fix responsibility for the accident.

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(3) To determine damages involved.

(4) To record factual data which might be necessary for the adjudication of a possible claims case.

### 1.37 INVESTIGATING PROCEDURES

Regardless of the type of accident, any uninjured forest officer at the scene or in the immediate vicinity of an accident, is responsible for obtaining information which will help the investigating team.

(1) The scene of the accident SHALL remain as undisturbed as possible until investigated. The first step is a personal visit by the investigating officers to the scene as soon as possible after the accident.

(2) In case of serious injuries, if the Regional, Station or Chief's Office investigators cannot arrive as soon as the unit investigators, the latter SHALL proceed with the investigation.

(3) The investigators SHALL determine the cause, fix the responsibility, and recommend steps to prevent similar accidents.

(4) In cases involving serious injury or substantial property damage, photographs should be taken, and a sketch map of the site should be prepared showing such items as topography, location of people, and equipment before and after the accident, point of impact if any, compass points, direction of travel, and road, trail, ground and weather conditions.

(5) The investigating officers SHALL interview witnesses and obtain their statements. Witnesses SHALL be interviewed separately. They may be given assistance in preparing statements, using their own words.



## 1.37(6)

1.37 (6) A statement should be obtained from the attending physician, if any, covering a description of whether disability is likely to be temporary or permanent, probable time required for recovery, and degree of permanent disability, if any.

(7) The following persons should participate in serious injury investigations:

- a. The investigating officers. (Team)
- b. The supervisory officer in immediate charge of the project or local administrative unit.
- c. The persons involved in the accident.
- d. Other participants should include, where circumstances warrant, one or more of the following: safety advisor, specialist, claims officer, cooperator. The use of a specialist from another Region or agency is recommended.

## 1.38 ACCIDENT REPORTING

A. Accidents SHALL be reported accurately, completely, and currently in accordance with requirements set forth in this section.

(1) Injury Reports to Bureau of Employees' Compensation. These reports provide the basis for determining employee benefits under the Federal Employees' Compensation Act. In- FSH 6173 instructions for reporting injuries to BEC are outlined in FSH 6173.

(2) Report to Regional Office or Station.

- a. Report by telephone or wire accidents involving Government employees or the Federal Government which result in death, possible death, disabling injury to private citizen, or substantial property damage.

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b. Send required investigation reports to the Regional Office or Station within 10 days after the accident.

(3) Report to the Office of the General Counsel. The local representative of the Office of the General Counsel (FSM 1545) shall be FSM 1545 notified immediately when an employee, performing official duties is involved in any accident causing private property damage in excess of \$1,000 or serious injury to private persons. This notification is necessary for the Office of the General Counsel, in proper cases, to notify the United States Attorney and protect the interests of the Government as well as the employee concerned. This must be done regardless of whether the Office of the General Counsel will be requested to represent the employee.

(4) Report to Washington Office.

a. Where accident involving Government employees results in serious injury or death, the Regional Office or Station will wire or phone the Division of Personnel Management, Washington 25, D. C., within 24 hours from time of accident giving name of deceased or injured, age, working title, cause if known, location of accident, time of accident, next of kin, and status of notification of next of kin.

b. Send investigative report (2 copies) to the Washington Office within 30 days after the accident.

(5) Report to Federal Aviation Agency. The FAA District Officer for the locality SHALL be informed promptly of any accident involving aircraft operated by the Forest Service in accordance with FAA requirements.

(6) Notification of next of kin. In serious accidents or cases where next of kin might be gravely concerned, notify them immediately and before any

other releases. Unit supervisors should determine the best method of notification to be used.

(7) Report on foreign national. In case a foreign national is killed or seriously injured, immediate notification SHALL be given to the victim's nearest consulate or embassy; other United States agencies such as the United States Employment Service, or local civil authorities, such as the sheriff.

## B. Report Forms

The following forms will be used when applicable:

(1) BEC forms (Refer to FSH 6173) FSH 6173

(2) AD-278 - Supervisor's Report of Accident. This form replaces SF-91a and SF-92. It has been designed for use in connection with Automatic Data Processing Operations. It should be filled out by the immediate supervisor. A separate report is required for each injured employee, motor vehicle accident, aircraft accident, and other accidents. FSH 6181.4

(3) SF-91 Revised. Operator's Report of Motor Vehicle Accident. To be prepared by operator.

(4) SF-91a - Investigation Report of Motor Vehicle Accident. This form is still required by GSA on accidents involving Motor Pool vehicles and will continue to be stocked in the Central Supply Section.

(5) SF-92a - Report of Accident (other than motor vehicle or aircraft). To be used in accidents resulting in damage to private property or injury to private citizens.

(6) SF-94 Revised - Statement of Witness. To be prepared by persons who witnessed the accident.

(7) SF-95 - Claim for Damage or Injury. This form is to be provided the person injured or to those who suffered property damage upon his or her request for information on how to submit a claim. Claims should not be solicited. (A claim form is not necessary as any written form of claim dated and signed by claimant will suffice.)

(8) State and Local forms - employees will prepare and submit accident report forms as required.

(9) Federal Aviation Agency (FAA) forms. Required forms will be prepared and forwarded to the office of the Federal Aviation Agency designated for the locality. Sufficient copies shall be made to fulfill Forest Service report needs.

### C. Narrative Report

A complete narrative report is required for all accidents causing death or possible death, i.e., (fractured skull, internal injuries, broken back, etc.) or disabling injury to Government employees; injury or possible injury to private individuals; damage in excess of \$50 to Government motor vehicle, aircraft, or other property; damage to private property in any amount. All material should be indexed and referenced where the nature of the report warrants. The report SHALL be signed by the investigators. The forms previously listed will suffice for all other accidents.

### Narrative Report of Accident

(1) Resume of Accident. This should be a brief account providing the reviewer with a thumb-nail sketch of the accident. It should include only the



essentials such as the type of accident, date, time, places, names of injured, age, extent of injuries, and what the injured was doing at the time of the accident.

(2) The Investigation. This item should give the particulars on how the investigation was made. Who made it, and their roles on the investigation team and their normal positions? What outside experts were utilized and why; what cooperators participated; when was the investigation started; how long did it continue; how was the investigation conducted; where was it conducted? Don't go into excessive detail on what the investigator did. Tell enough so it will be clear how the investigation was carried out.

(3) Findings and Conclusions. A statement or listing of the findings and conclusions reached by the investigating team, based on the evidence. Show:

- a. Direct causes--the immediate cause of the accident.
- b. Indirect causes--list the events and circumstances which contributed indirectly to the accident or which might be significant in preventing similar ones.
- c. Adherence to instruction and standards.
- d. Responsibility and accountability.
- e. Insurance.
- f. Damages involved, including possible claims information and the data necessary for their adjudication.

(4) Recommendations. As a result of the investigation, the investigators should make concrete, action-type recommendations for the prevention of similar accidents. These should take into account the direct and indirect causes of the accident discovered in the investigation.



(5) Details of the Accident. A detailed statement, normally in chronological order, of the background, the events leading up to the accident, the accident, and the results. Answer: Who? What? Where? Why? How? All material not labeled as opinion or conjecture should be completely supportable facts.

(6) Appendix. The appendix should contain all pertinent supporting material including:

- a. maps, exhibits, drawings, sketches, pictures.
- b. witness statements.
- c. coroner's report.
- d. autopsy reports.
- e. death certificates.
- f. attending physician's statements.
- g. maintenance status of equipment involved.
- h. qualifications, experience record, and training of principals.
- i. pertinent cooperative agreements, contracts, etc.
- j. copies of other agencies' reports.
- k. any other related material.

1.38D - (Chart) Report Preparation and Distribution

TYPE OF CASE (Involving U.S. Forest Service) REPORTS FORMS	Whom to Notify	Responsibility for Investigation	Reports - Preparation and Distribution			
			No. Copies Pre- pared	DISTRIBUTION		
				ADMIN. UNIT	R. F. or D.	W.O.
<u>I..Accidents Causing Death or Injury that Might Result in Death.</u>	Report by wire or phone through regular channels to unit office, RO, or Station, WO & BEC.	Regional For- ester or Station Director or other comparable unit head. (A representative of the Chief's Office will in- vestigate acci- dents where 5 or more deaths occur.)				
BEC Reports (See FSH 6173) Narrative Re- port	Next of Kin.		5	1	2	2
AD-278 - Su- pervisor's Report of Accident	State or local authorities as required. (Coroner, etc.)		4	2	1	1**
SF-94 - State- ment of Witness			5	1	2	2
SF-95 - Claim			5	1	2	2
SF-91 - Vehi- cle Operator's Report (if appli- cable)	Also FAA in case of airplane accidents.		5	1	2	2
FAA Aircraft Accident Report (if applicable)			7*	1	2	2
SF-92a - Re- port of Accident Other than Vehi- cle or Aircraft (if applicable)						
<u>II. Disabling In- juries--Federal Employees.</u>	Wire or phone unit head who will follow through in ac- cordance with Regional policy.	Forest Supervi- sor or Station Project Leader or other compa- rable unit head.				
BEC Reports (See FSH 6173) Narrative Re- port	FAA must be no- tified in case of airplane ac- cidents,		3	1	2	
AD-278 - Su- pervisor's Report of Accident			4	2	1	1**
SF-94 - State- ment of Witness			3	1	2	
SF-95 - Claim	State or local authorities as required.		3	1	2	
SF-91 - Vehi- cle Operator's Report (if appli- cable)			3	1	2	
FAA Aircraft Accident Report (if applicable)			5*	1	2	
SF-92a- Report of Accident other than Motor Vehi- cle or Aircraft (if applicable)			3	1	2	

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<u>III. Disabling Injuries--Non-Federal Employees.</u>  Narrative Report AD-278 - Supervisor's Report of Accident SF-95 - Claim SF-94 - Statement of Witness SF-92a - Report of Accident other than Vehicle of Aircraft SF-91 - Vehicle Operator's Report (if applicable) FAA Aircraft Accident Report (if applicable)	Wire or phone through regular channels unit head & RF or D.	Regional Forester or Director; other comparable unit head.	3  4 3  3  3  3  5*	1  2 1  1  1  1	2  1 2  2  2  2	1**
<u>IV. Medical Treatment. Injury--Not Lost Time (chargeable cases only).</u>  BEC Reports (See FSH 6173) AD-278 - Supervisor's Report of Accident SF-94 - Statement of Witness	Immediate Supervisor	Ranger, project leader, or other comparable unit head.	4  2	2  2	1	1**
<u>V. First Aid Injury without Medical Attention or Lost Time.</u>  BEC Reports (See FSH 6173) Management reports as required locally.	Immediate Supervisor					
<u>VI. Property Damage--Other.</u>  Narrative Report AD-278 - Supervisor's Report of Accident SF-94 - Statement of Witness SF-95 - Claim (if applicable) refer FSH 6411.26 FF-5-Report on Fire refer FSH 6443.44(2)	Local representative of Office General Counsel if damage to private property is in excess of \$1,000.	Forest Supervisor or Station Project Leader or comparable unit head where damage to Govt. property exceeds \$50 or \$25 pvt. property. Ranger, project leader, or other comparable unit head when damage is less than shown above.	3  4 3 3  4	2  2 1 1	1  1 2 2	1**  2

TYPE OF CASE (Involving U.S. Forest Service) REPORTS FORMS	Whom to Notify	Responsibility for Investigation	Reports - Preparation and Distribution			
			No. Copies Pre- pared	DISTRIBUTION		
				ADMIN. UNIT	R. F. or D.	W.O.
<u>VII. Motor Vehicle Accidents</u> <u>Which Do Not In-</u> <u>volve Disabling</u> <u>Injuries but Re-</u> <u>sult in Damage in</u> <u>Excess of \$50 to</u> <u>Government Vehi-</u> <u>cle or Involve</u> <u>Private Citizen.</u>	Unit head plus compliance to local instruc- tions.	Supervisor of administrative unit or designee.				
Narrative Re- port			3	1	2	
SF-91 - Opera- tor's Report			3	1	2	
SF-94 - State- ment of Witness			3	1	2	
AD-278 - Su- pervisor's Report of Accident			4	2	1	1**
SF-95 - Claim (If applicable)			3	1	2	
State or local forms as required. (For GSA vehicles where total prop- erty damage is less than \$250 and there are no injuries, add one extra set of forms. If more than \$250 or there is an injury, add 2 extra sets of forms. For all vehicle accidents involving a GSA vehicle, report to GSA immedi- ately. Form SF-91a is still required by GSA on acci- dents involving Motor Pool vehi- cles).						

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VIII. Damage to Forest Service vehicle amounting to less than \$50, which does not involve personal injury or private property damage, will be reported on Form AD-278. This form will also be used for reporting damage above \$50 to vehicles used for protection of life and property where it was administratively determined advantageous to assign vehicles to unusually rough use for periods of emergency.	Unit head plus compliance to local or regional instructions.	Immediate supervisor and compliance to local or regional instructions.				
			4	2	1	1**

\*Submit 2 copies to FAA.

\*\*Regional office or station shall submit first copy of AD-278 to W.O. to arrive by the 10th of each month.

## 1.39 REVIEWING PROCEDURES & CLAIMS OFFICER RESPONSIBILITY

(1) Regional Forester, Director, or Acting. Investigation reports of serious accidents and/or fatalities SHALL be reviewed by the Regional Forester, Director, or acting. Their recommendations SHALL be included in letters of transmittal to the Chief with two copies of the investigation report.

(2) Forest Supervisor or Project Leader, Supervisors, station leaders, and other comparable unit heads SHALL review all other investigation reports of accidents resulting from operations under their supervision and make specific recommendations. In cases involving claims, make specific recommendations as to whether or not the claim should be allowed.

When, in the judgment of the unit head, negligence of the employee justifies disciplinary action, the unit head will prepare a separate report recommending appropriate action. These reports are not part of the claim file. They should be written under a code 6160,

1.39(2)A.

Personnel Controls, designation and be prepared in accordance with instructions under disciplinary cases in FSH 6163. Reports should not be held until a claim is filed when the delay may FSH 6163 prevent desirable administrative action.

If an employee is believed to be negligent in a case involving damage to Government property, the forest supervisor, project leader, or comparable unit head, is responsible for notifying his time reporting section not to process a final salary payment for such employee before administrative action in the case has been completed.

B. RESPONSIBILITY OF CLAIMS OFFICER

As the Forest Service Claims Officer, the fiscal agent is responsible to his Regional Forester or director for:

(1) Obtaining reports of accidents which may result in claims either against or in favor of the United States.

(2) Prompt and thorough review and handling of each case.

(3) Securing additional data and recommendations when needed to provide for the accurate and complete presentation of the facts essential to the full protection of the interests of the Government and its employees.

(4) Seeing that the interests of a claimant against the United States are not harmed by a delay in processing within the Forest Service.

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(5) Processing of any claims in accordance with current requirements.

Because each claim case requires the early attention of the Claims Officer, the original set of forms covering a reportable accident which involves property damage or injury of any person other than a Forest Service employee will be marked for the attention of the fiscal agent and forwarded promptly. Accurate, complete, and current reporting is important.

Procedural instructions for the processing FSH 6570 of claims are provided in FSH 6570.





# CHAPTER

# 2

## Travel



Car



Air



Foot



Animal



Water





## CHAPTER 2. TRAVEL

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## 2.1 CAR TRAVEL

### 2.11 A. GENERAL--FOR ALL DRIVERS

(1) MOTOR VEHICLES ARE ONE OF OUR GREATEST KILLERS. ALL DRIVERS SHALL ADOPT A POLICY OF DEFENSIVE DRIVING. THIS MEANS--

a. DRIVING SO AS TO AVOID ACCIDENT SITUATIONS CREATED BY THE MISTAKES OF OTHERS, OR BY WEATHER AND ROAD CONDITIONS.

b. YIELDING THE RIGHT-OF-WAY EVEN WHEN, BY ALL RULES OF THE ROAD, IT IS ACTUALLY YOURS.

c. MAKING AN UNBROKEN SERIES OF CONCESSIONS TO OTHER DRIVERS WHO ARE THOUGHTLESS, UNSKILLED, OR IGNORANT OF THE HAZARDS THEY CREATE.

d. Have an attitude of confidence that you can drive without ever having a preventable accident.

e. Aim high in steering--get the big picture--be aware of traffic situations developing as far ahead of vehicle as possible.

f. Expect reckless, illegal, and clumsy behavior on the part of the other driver and be prepared to adjust driving to avoid accidents.

g. Be especially courteous to pedestrians--honor their right-of-way privileges. Be on the alert to avoid pedestrians at unexpected places, especially children.



(2) VEHICLES, OWNED OR LEASED BY THE FOREST SERVICE, SHALL BE DRIVEN ONLY BY PHYSICALLY FIT EMPLOYEES WHO HAVE

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CAR

2.11(2)

QUALIFIED FOR AND WHO HOLD BOTH STATE DRIVER'S LICENSE AND GOVERNMENT OPERATOR'S IDENTIFICATION CARD, AND WHO SHALL BE THOROUGHLY FAMILIAR WITH THIS SECTION OF THE SAFETY CODE.

a. In an emergency, others FSH2 6439.3 who hold a valid state operator's permit have no apparent physical defects, and have a general knowledge of this Motor Vehicle Travel section of the Safety Code, may be permitted to drive a vehicle owned or leased by the Forest Service.

b. New employees who meet all the requirements for a Government Operator's Identification card may be issued a temporary permit pending final qualification by a qualified examiner.

c. Non-employees in cooperating public agencies whose duties may include driving Government-owned or leased vehicles SHALL be examined and issued a regular permit.



(3) Any driver SHALL be grounded if he is habitually careless, repeatedly uses poor judgment at the wheel, or willfully violates driving regulations.

(4) A driver whose known deficiencies make his driving unsafe SHALL be grounded until deficiencies are remedied, or his driving SHALL be restricted to compensate for limiting factors.



(5) ALL DRIVERS SHALL PULL OFF THE ROAD FOR A SHORT REST, COFFEE BREAK, OR CHANGE OF DRIVERS IF THEY GET DROWSY AT THE WHEEL DUE TO LACK OF SLEEP, LONG TRIP, MOTOR DRONE, STRAIGHTAWAYS, ETC.



(6) Daily, before driving any assigned vehicle, the driver SHALL thoroughly check for adequate brakes, steering, windshield wipers, tires, lights, horn, and tight exhaust system.



(7) The driver SHALL have no additional duties while operating the vehicle.

a. If necessary to refer to a map or instructions he SHALL pull off the road and stop.

b. When scouting the countryside or inspecting power or telephone lines an observer should be used. If an observer is not used, the driver SHALL stop to observe and make notes.

(8) Every Forest Service vehicle SHALL be equipped with seat belts, warning flags or flares, and a first aid kit. SEAT BELTS SHALL BE WORN WHEN PROVIDED. HSC 7.39(5)

(9) Have knowledge and strictly observe all traffic rules and regulations applicable to area in which vehicle is being operated.

2.11(10)

2.11(10) DRIVER SHALL DRIVE AT A SPEED THAT PERMITS FULL CONTROL OF THE CAR, ALLOWING FOR ALL FACTORS SUCH AS ROAD, WEATHER, VISIBILITY, LIGHT AND TRAFFIC CONDITIONS.



(11) ON CURVES, THE DRIVER SHALL BE ABLE TO STOP VEHICLE WITHIN LESS THAN HALF OF THE VISIBLE DISTANCE.

(12) When starting to go downgrade, the driver SHOULD shift vehicle into a lower gear whenever the steepness or sharp curves indicate prolonged brake pressure will be needed to maintain control. Release brake pressure frequently to avoid burning lining.

(13) Chains or mud, snow, or tractionized tire (If state law permits) HSC 7.21c(8) treads SHALL be used for hazardous road conditions when necessary.

(14) When running the motor of a parked vehicle to provide heat, a window SHALL be completely open.

(15) Drivers SHALL NOT transport loose articles on shelf behind seat where rear vision will be obscured or create hazard of articles being thrown forward when car stops suddenly.

(16) Drivers SHALL--

a. Make certain the way is clear before backing or maneuvering. Driver SHALL be directed by qualified signalmen, or if alone, get out and look before backing.

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CAR



b. Avoid overloading the front seat. Unless there is plenty of room to manipulate controls, not more than two persons SHALL occupy the front seat.

c. STOP at Railroad Crossings when:

1. Automatic lights are flashing.  
2. A clear view of right-of-way is restricted to less than 500 feet in both directions.

3. Hauling more than 6 men in the bed of a truck.

4. Hauling explosives.

d. After stop at double crossing, make sure second track is clear.

e. On open highways, proceed across railroad crossing only when there are no oncoming trains within 1500 feet.

f. When driving in convoy, keep at least 200 feet apart, or farther if required by state law.



(17) VEHICLE WHEELS SHALL BE BLOCKED WHERE THERE IS ANY DANGER OF VEHICLE ROLLING, SUCH AS WHEN JACKED UP, OR WHEN PARKED ON A HILL WITHOUT CURBS OR BANKS. TURN FRONT WHEEL AGAINST CURB OR BANK WHEN AVAILABLE.



(18) Vehicles SHOULD be parked off the traveled portion of the highway.

a. When necessary to park near or partly on, the traveled portion of the highway, warning devices SHALL be placed in accordance with state or local regulations.

2.11B.

## 2.11 B. EXPRESSWAY DRIVING.

- (1) Special considerations prior to entering:
  - a. Have ample fuel.
  - b. Study map in advance--know where you expect to leave and how to identify exit in advance.
  - c. Know the special driving practices and precautions required.

(2) When possible, enter from acceleration lane at approximate speed of through traffic. While merging, check carefully and continuously to the left rear, being sure the traffic gap is sufficient to allow entry without collision and that traffic approaching from rear is not forced to slow down or swerve from its lane. Be sure you do not overtake the car entering ahead of you.



(3) Keep alert for directional signs--Follow the signs directing you to destination no matter what direction they seem to be taking.

(4) Never back up, turn around or cut across a dividing strip.

(5) Remember that faster-than-usual traffic adds to your driving responsibilities. You have to think ahead and frequently act ahead of your usual driving habits.

(6) Be alert and anticipate moves of other drivers.



(7) Plan on much longer stopping distances due to higher speeds involved.

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CAR

(8) Glance at passing scenery to avoid steady focusing of eyes and avoid becoming a victim of "highway hypnosis". HSC 2.11(5)

(9) Avoid long driving periods, especially at night. If possible change drivers regularly. HSC 2.11(5)

(10) Allow a greater following distance than on ordinary roads--at least 20 feet for each ten miles per hour.



(11) Use the passing lane properly--stay in right lane except when passing--check traffic front and rear before shifting lanes. Use hand or electric signal before changing lanes--pass in left lane and stay in it until you can see car you have passed in rear mirror--change lanes smoothly.

(12) If you must stop because of an emergency, give stop signal as early as possible and drive as far off roadway as the shoulder permits. As distress signal raise hood or tie handkerchief to radio antenna, door handle, or from top of window on driver's side. Do not leave car until help comes. Use low gear and battery to get stalled vehicle to shoulder.



(13) Only leave a vehicle that is stalled within traffic lanes when there is greater danger involved by remaining. Signal intention by waving handkerchief or bright cloth. Go to nearest edge and stay there until help arrives.



(14) Anticipate exit--watch for directional signs--move to proper lane as early as possible. Drive into deceleration lane and slow to posted exit speed.

2.11(15)

2.11(15) Check speed carefully after leaving expressway--drivers often exceed safe or posted speed limits without being aware of it after long periods at high speed.

(16) Promptly adapt your driving to the new situation.

## 2.12 TRUCK DRIVING

HSC 3.14(1)c.

(1) Every truck and pickup regularly used for transporting persons SHALL have--

a. SUFFICIENTLY HIGH AND STRONG GUARDRAILS TO PREVENT FALLS.

b. Seats anchored to the vehicle bed.

c. Substantial steps or endgates for loading and unloading. Rear bumper can serve as step on pickups.

d. The exhaust system SHALL be arranged to prevent exhaust fumes being drawn into passenger areas.



(2) Men and tools or supplies SHALL be hauled together only when--

a. Tools are enclosed in substantial toolbox attached to the bed and equipped with securely fastened cover.

b. In emergency, tools are wrapped in canvas or other material and lashed to the truck.

c. Supplies are securely lashed to the truck.

(3) IN NO CASE SHALL PASSENGERS RIDE ON TOP OF A LOAD OF SUPPLIES.

(4) No passengers SHALL be carried in the body of a truck carrying explosives or toxic or flammable

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CAR

substances, except that gasoline in safety cans may be carried with passengers if put in tool boxes or fastened to prevent movement.

(5) The driver or foreman in charge SHALL be sure all persons are seated and endgates SHALL be in place before vehicle starts.

(6) Passengers SHALL ride only in cab or body of motor vehicles. This means--

- a. Arms or legs inside of racks or ends of truck body.
- b. Everybody seated while vehicle is in motion.
- c. No riding on hood, fender, or running board.



(7) Dump-truck drivers SHALL--

HSC 2.12

a. Be sure the hoist control mechanism cannot be accidentally engaged, when hauling men and supplies. Chain front of bed to frame.

b. Always get out of truck when it is being loaded.

(8) Only dump-truck drivers or dump bosses SHALL trip the tailgate, and then only after the truck has been brought to a full stop.



## 2.13 EMERGENCY DRIVING

(1) SHIFTS SHOULD NEVER EXCEED 12 HOURS.

(2) Following the first 24 hours, truck-drivers should operate under the 8-hour day.

(3) Each duty shift SHALL be followed by off-duty rest period adequate to relieve fatigue.

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## 2.13(4)

2.13 (4) Whenever men are being hauled at night, or under other conditions of poor visibility, a relief driver or alert overhead SHALL ride in the cab with the driver.

(5) Passengers may be transported in the bed of vehicles without seats or guardrails, provided they are required to sit on the floor. If such use continues, seats and guardrails SHALL be provided as soon as possible.

(6) All vehicles going to fires SHALL abide by traffic lights and stop signs unless escorted by police.

(7) Vehicles parked on highways at fires SHALL be marked by flags or flares to warn motorists of presence of equipment and workers.

## 2.14 TRAILERS

(1) When any motor vehicle is used to tow a trailer, its brakes and the brakes of the trailer SHALL be able to stop the loaded trailer within maximum distances specified by State law.

FSH2 6439.3

(2) When used in night operations, trailers SHALL be equipped with standard taillights and stoplights that function properly.

(3) Horse and similar trailers SHALL be equipped with trailer jacks or landing gear.

(4) A safety chain SHALL be used in addition to trailer coupling or tow bar.

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(5) Something other than the hand SHALL be used to steer the coupling device into position for locking.

(6) House trailers SHALL be equipped with:

a. At least two exits

b. An adequate grounding device with a rod driven into moist soil and a copper wire connected to the trailer frame.

c. AN APPROVED INSTALLATION FOR USE OF BOTTLED GAS, IF HSC 3.36 GAS IS NEEDED.

(7) Trailers of any size or type SHALL be pulled only by a vehicle properly equipped for towing and of size and weight sufficient to handle the weight of the trailer.

(8) Only qualified drivers who have passed the Regional requirements SHALL drive vehicles towing trailers.

## 2.15 RAILROAD SPEEDERS

(1) Forest Service employees riding on or operating railroad speeders SHALL know and comply with applicable safety regulations of the railroad.







## 2.2 AIR TRAVEL

### 2.21 GENERAL

(1) Provisions of the Forest Service Manual and Handbook and the Civil Air Manuals SHALL be enforced unless deviations are authorized by the Chief or the Federal Aviation Agency, or the operations are conducted by the Armed Forces under military air regulations. FSM & FSH 5700

(2) THE PILOT IN COMMAND SHALL BE RESPONSIBLE FOR THE SAFETY OF THE AIRCRAFT, OCCUPANTS, AND CARGO. HE HAS COMPLETE AUTHORITY TO POSTPONE, CHANGE, OR CANCEL HIS FLIGHT WHEN HE BELIEVES EXISTING OR IMPENDING CONDITIONS MAKE IT UNSAFE. FSH 5705.11e



(3) The responsible Forest Officer SHALL cancel or terminate operations when, in his opinion, conditions make air operations unusually hazardous or when the pilot does not adhere to essential precautionary measures.

(4) Forest Service personnel may make official flights with cooperators in private or public aircraft when mutually advantageous. The pilot and aircraft SHALL meet the requirements of the FS Manual and Handbook applying to similar flying in chartered aircraft. FSH 5705.7

(5) Flight plans for all missions SHALL be filed and all overdue aircraft SHALL be contacted or traced promptly.

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## 2.21(6)

2.21 (6) Aircraft occupants SHALL use only safety matches or mechanical lighters. Only safety matches in tight metal containers and mechanical lighters SHALL be carried in smoke-jumper packs, para-cargo, and airfreight.

(7) Cigarette smoking may be permitted only if the plane is equipped with ashtrays and does not constitute undue discomfort to FSH 5705.93 others, but never during refueling, takeoffs, landings, or at other times specified by the pilot.

(8) All cargo and airfreight SHALL be securely fastened in place.

(9) Experimenting, research, and development in air operations SHALL be limited to work approved and assigned by the Chief.

### (10) Signals

FSH 5705.92b

#### a. Ground-to-Aircraft Signals

Require doctor, serious injury .....	-
Require medical supplies .....	=
Unable to proceed .....	x
Require food and water .....	F
	V
Require firearms and ammunition .....	V
Require map and compass .....	□
Require signal lamp with battery and radio ...	--
Indicate direction to proceed .....	K
Am proceeding in this direction .....	→
Will attempt takeoff .....	1>
Aircraft seriously damaged .....	L7
Probably safe to land here .....	Δ
Require fuel and oil .....	L

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AIR

All well .....	LL
No .....	N
Yes .....	Y
Not understood .....	L
Require Mechanic .....	W
Help urgently needed (international distress signal) .....	SOS

#### b. Aircraft-to-Ground Signals

Received Message ..... Rock Aircraft.  
 Will Drop Message ..... Gun Motor three times.  
 Fire Location ..... Circle three times over spot.

### 2.22 PERSONNEL

(1) Each Region, Station, and FSH 5703.4  
 W. O. unit and subordinate unit having  
 under its jurisdiction use of aircraft SHALL designate  
 an air operations officer who SHALL check on con-  
 formance with the instructions in the Health and  
Safety Code, the Forest Service Handbook, and Civil  
Air Manual.

(2) Qualification of all pilots, as FSH 5703.3  
 well as employees not employed pri-  
 marily as pilots, but who occasionally pilot aircraft  
 on official work or travel, SHALL comply with the  
Forest Service Handbook.

(3) Airplane pilots, except those FSH 5705.31f  
 flying military or scheduled airlines 5730.5  
 aircraft, will be limited to the follow-  
 ing flight hours:

- a. Eight hours the first day.
- b. Six hours per 24-hour period thereafter.
- c. Not to exceed 38 hours in any 6-day  
 period.
- d. After six consecutive flight days, a full  
 day's rest is required.

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## 2.22(3)e

2.22(3) e. A 2-hour rest period is required within the maximum flight hours for a 24-hour period. The rest should be arranged between 3 and 5 hours rest time.

f. These limitations apply to all pilots (Forest Service and commercial) flying any type mission on Forest Service work.

g. Flight time is not entirely reliable as a gauge of accumulative fatigue. There is a great variation in character of flights, length and timing of alert periods, opportunity for rest and strength and recuperative powers of individuals. Officers responsible for dispatching and briefing must be alert to note indication of undue fatigue and take appropriate action promptly, regardless of total flight time.

h. Provision SHALL be made for relief pilot when necessary.

## 2.23 FLYING PRACTICES

(1) Before engaging in local flights, pilots SHALL familiarize themselves with the operating area and with important hazards of flying conditions peculiar to the area. This SHALL include traffic and hazards as well as peculiarities of airfields or water landing areas to be used as terminals.

(2) In the air, the pilot SHALL--

a. Reach a safe altitude above the airfield or water landing area before leaving the vicinity, unless the mission, nature of surrounding terrain, or local air traffic rules make this impractical.

b. On all flights in single-engine aircraft, follow as far as practical, routes over open valleys, highways, plateaus, waterways, or other terrain offering best opportunity for safe emergency landings.

c. Except when landing or taking off, or in such operations as dropping cargo or applying materials when low flight is essential and specifically authorized, always fly fixed-wing aircraft at least 500 feet from obstacles, domestic animals, persons, vehicles, or boats. Avoid congested areas.



d. When flying up drainage, always know topography ahead and maintain sufficient altitude plus wide margin of safety and flight course to permit safe turning or flying over sides or head of drainage.

e. Avoid blind or instrument flight in single-engine aircraft, except FSH 5705.31c for pilot training or practice, for short periods in passing through overcast where location of all obstacles is known, or for urgent emergencies. Such flights SHALL not be made unless the airplane is equipped for instrument flying and the pilot holds a current certificate and rating.

f. In all mountain flying, provide an extra wide margin of safety. Carry light loads to give high performance and a reserve of power.

## 2.24 EQUIPMENT

(1) Aircraft SHALL be maintained in accordance with instructions or recommendations of the aircraft and engine manufacturers or other instructions approved by FAA.

(2) All single-engine aircraft FSH 5705.21b should have approved shoulder harness for front seats. Such harness SHALL be provided in all fixed-wing aircraft used in spraying and other missions requiring prolonged low-level flight. Shoulder harness SHALL be worn during takeoff or landing, when flying within 1,000 feet of the ground and at other times specified by the pilot or other responsible person.

2.24(3)

2.24 (3) All aircraft SHALL have FAA FSH 5705.21a approved seats and seat belts for all occupants except when special requirements of use or mission make this impractical. Exception for each special requirement SHALL be approved by the Chief. Every other means SHALL be taken to provide maximum protection for the occupants during landing, takeoff, and flight in rough air. All passengers SHALL use seats and seat belts during takeoff, landing, rough air, and such times specified by the pilot or other responsible person.



(4) In addition to equipment required by Civil Air Manual and the Forest Service Handbook, all fixed-wing aircraft SHALL carry the following: FSH 5704.41 HSC 2.25

- a. Land planes: FSH 5704.41
  - 1. Parachutes when required.
  - 2. Copy of air-ground visual signal code.
  - 3. First aid kit.
  - 4. Emergency rations (optional for accessible areas).
  - 5. Flashlight
  - 6. Message droppers.
  - 7. Fire extinguisher.
  - 8. Maps of operating area.
- b. Seaplanes SHALL carry a life preserver for each occupant, and a canoe paddle, in addition to items above. FSH 5704.42



- c. Helicopters
  - 1. First Aid kit.
  - 2. Fire extinguisher
  - 3. Air-ground signal code
  - 4. Maps of operating area

5. Emergency rations (optional for accessible areas).

6. Message droppers.

7. Sheath knife.

(5) Single-engine aircraft SHOULD NOT be used for night flights.

## 2.25 PARACHUTES

(1) Before taking off, everybody required or electing to wear parachutes SHALL be instructed in adjusting, wearing, and using them, and in bailout procedures. Wherever practicable, parachutes SHALL be made available to persons electing to wear them.

FSM 5705.4  
FSH 5705.31J2  
HSC 2.24(4)

(2) Parachutes or parachute harness with pack immediately available SHALL be worn as follows:

a. By all plane occupants where pilot determines he cannot make a forced landing with reasonable chance of survival over most of the planned flight route.

b. All plane occupants SHALL wear them when dropping cargo or smokejumpers.

(3) Wearing parachutes SHALL be optional--

a. Where pilot determines he can make a forced landing with reasonable chance of survival over most of the planned flight route.

b. When continuous flights are required at less than 1,000 feet above the treetops, such as spray and survey jobs.

c. Pilots and co-pilots in multi-engine aircraft on cargo dropping missions.

(4) Parachutes SHALL NOT be required--

a. In multi-engine ships when maintained and operated at safety standards equal to air carriers. (CAM 42).



## 2.25(4)b

2.25(4) b. When the pilot determines the weight of the parachute or harness with pack will seriously increase the hazard of an emergency flight.

c. On occasional emergency flights when they cannot practicably be made available in advance.

## 2.26 CARGO DROPPING

(1) Cargo-dropping missions SHALL FSH 5710 be coordinated with other air traffic in the vicinity of the drop target by the Air Officer or Air Traffic Manager.

(2) A heavy strap or suitable bar SHALL be kept in place across doorway used for cargo dropping except when its removal is necessary in discharging cargo.



(3) A large sharp knife or other suitable emergency quick release devices SHALL be provided at the cargo discharge port to permit cutting away fouled parachutes.

(4) Cargo SHALL be dropped only from planes approved for cargo dropping by air officers designated by the Regional Forester or Station Director.



(4) Cargo SHALL be dropped in accordance with the Forest Service Handbook and supplemental instructions issued by the Regional Forester or Station Director.



(6) Cargo SHALL NOT be dropped from aircraft manned only by a pilot unless such aircraft is equipped with an approved remote control cargo-releasing device.

(7) Pilots and crew including FSH 5715.3  
dropper SHALL be fully qualified and  
trained. See Forest Service Handbook.

(8) The pilot and cargo dropper SHALL make certain the target area is clear of personnel, animals, and vehicles before starting cargo-dropping runs.

(9) During dropping operations, FSH 5715.33  
cargo dropper SHALL--

a. Wear snug-fitting clothes free from openings or loops that might catch on paracargo.

b. Wear shoes with nonskid soles.

c. Wear approved cargo-droppers's harness while working near FSH 5713.2-7 the open door of medium and large cargo airplanes.

d. Inspect all cargo for loose, faulty or weak packing.

(10) The Air Officer and Retrieving Crew Leader in charge of ground operations SHALL-- FSH 5712.54

a. Select, subject to pilot's approval, cargo-dropping target, keeping in mind wind drift of cargo, low altitude flight precautions, and approach and get-away, free from obstructions, excessive air turbulence, smoke and clouds.

b. Take necessary action to clear the target danger zone of any person, animals and vehicles, prior to arrival of the airplane. The danger zone SHALL be the area within a rectangular strip approximately 200 feet wide, running along each side of the flight path of the plane as it passes over the target.

## 2.26(10)

Each strip SHALL extend from target approximately 300 feet in the direction from which the plane approaches the target and 1,300 feet or more in the direction the plane leaves the target. The camp SHALL be at least 600 feet from the target and outside the danger zone.

c. Arrange for alert, active lookouts to observe and record with compass bearings, where cargo is landing and to keep danger zone clear of people until the entire load has been dropped and the plane has left the target area. Have prior arranged signal for All Clear.

d. Keep personnel in vicinity of drop target from bunching up, preferably in open, away from dead or defective trees or snags that cargo might strike and break out limb or top. Logs, brush or steep hillsides which interfere with dodging dropped cargo should be avoided.



2.27 SMOKEJUMPING. See Forest Service Handbook.

FSH 5740

2.28 HELICOPTERS

FSH 5750

(1) Before mission, pilot SHALL be briefed on other air traffic, terrain, and location of surface hazards, such as box canyons, radio towers, power cables, and telephone lines.

5704.33  
5705.32  
5705.31f  
5705.62  
5730.5

(2) When possible, routes permitting autorotative landing at any time SHALL be selected.

TRAVEL

AIR

(3) Helicopters SHALL observe HSC 2.22(3)  
flight duty limitations.

(4) All personnel working on or near a helicopter project SHALL observe these safety requirements:

a. Stay away from helicopter when rotor blades are in motion, unless authorized by the pilot or other authority. This means stay at least 50 feet away from small helicopters and 100 feet from large helicopters, double rotor.



b. ALWAYS APPROACH OR LEAVE FROM FRONT OR FROM SIDE NEAR FRONT, WHERE PILOT CAN SEE YOU. FSH 5705.62a

c. Never approach or leave ship from any side where ground is higher than ground where ship is standing or hovering.

d. Unless equipped with safety goggles or glasses, do not watch landings, takeoffs, or hovering, closer than 100 feet from the helicopter.

e. Safety belt SHALL be fastened at all times except when instructed by the pilot to release it.

f. Do not stand up in open cockpit models.

g. When leaving the ship, walk immediately away, to the front or side toward the front until you are at least 50 feet from the rotors.

h. Stay away from tail rotor at all times, and see that others do likewise.

i. Carry all tools horizontally when around helicopters.

j. Do not smoke within 50 feet of helicopter on the ground.

k. Do not smoke within 50 feet of fuel dumps or refueling equipment.

l. Never stand directly beneath the helicopter.

m. Indicate wind direction for landing helicopter with flag, dust, or other visual indicator.

2.28(4)n

2.28(4) n. Keep heliports clear of unauthorized personnel, equipment and loose objects.

o. Assign air service manager to helicopter operating areas to enforce safety regulations.

(5) All passengers SHALL observe these safety requirements:

a. Keep person, maps, clothing and equipment clear of aircraft controls.

b. Mechanical lighters and safety matches only are permitted.

c. Talking to the pilot during takeoff or landing is prohibited.

d. Keep oriented at all times.

e. Keep alert for hazards. Inform pilot.

(6) Helitanker - See Forest Service Handbook, and Air Tanker Guide. FSH 5733.12b  
5735.3

2.29 AIR APPLICATION OF MATERIAL FSH 5730  
5735.3

(1) The Forest Service Handbook and Air Tanker Guide SHALL be followed in all serial operations involving application of materials for fire, insect control or solid type purposes.

a. Lie face down, head toward oncoming aircraft with hard hat in place.

b. Discard hand tools to the side away from the body.

c. Grasp something firm to prevent being carried by load impact.

d. Do not run unless escape is possible and assured.

e. If in timber, stay clear of dead snags and far enough to clear falling tops and limbs as a result of drop.



(3) Only authorized personnel SHOULD be allowed near insecticide spray, loading, or mixing areas.

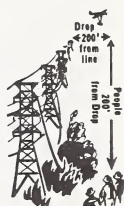
(4) Every effort SHOULD be made to prevent any insecticide from coming in contact with face or eyes. If this happens, effected areas should be washed thoroughly with water immediately.

(5) Passengers will not be carried in any aircraft engaged in air application work.

(6) Prior arrangements SHOULD be made with electric power companies to de-energize power lines of over 60,000 volts when it is necessary to apply borate or other solutions in the immediate vicinity of these lines.

a. ALL personnel SHALL be at least 200 feet from all types of power lines during the dropping of solutions unless the power has been turned off.

b. Personnel SHOULD NOT be under poles, towers or wires during drops because of the danger of breakage and falling debris.



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## 2.3 FOOT TRAVEL

### 2.31 GENERAL

HSC 5.23

(1) Clothing and nonskid boots SHALL be suited to the country, climate and the job, i.e., calked shoes for windfall country, rubber boots for snow, high tops for snake country, etc. Trousers SHOULD be cuffless for all field work. Stockings SHOULD be changed daily to prevent infections.



(2) EMPLOYEES SHALL AVOID TRAVELING OR WORKING ALONE IN ISOLATED AREAS INSOFAR AS PRACTICABLE, ESPECIALLY UNDER HAZARDOUS CONDITIONS.

(3) If it is necessary for a person to travel or work alone, he SHALL leave an itinerary of his planned trip with his immediate superior or some other responsible employee, and his family.

a. This itinerary SHALL indicate where he is going, the planned route of travel, and the approximate day and hour he will return.

b. If he fails to return on schedule, a search SHALL be started within a reasonable period.

(4) Equipment SHOULD be carried when traveling in back country as follows:

- a. First aid kit
- b. Snakebite kit (if in snake country)
- c. Compass



2.31(4)d.

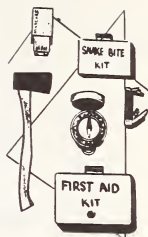
2.31(4) d. Matches (always in a water-proof container.)

e. Pocketknife

f. Belt axe

g. Flashlight (where night travel is contemplated.)

h. One day's supply of concentrated food.



(5) Workers SHALL--

a. Choose safe travel routes and stream crossings.

b. Avoid traveling or camping in snag areas in windy weather. Camping sites should be selected in areas free of unsound trees, limbs and steep ground where rocks may roll from above.

c. MAKE SURE OF SECURE FOOTING AND SAFE WORKING POSITIONS.

d. Always be on guard against injury from falling trees, snags, limbs, rolling logs, or rocks. If you hear a rolling rock, log, or tree, don't run blindly. Determine its falling direction, then get out of its path.

e. Be sure other workers know where you are working.

f. Guard against twigs and branches striking your eyes.

g. Watch your step! Rocky slopes, especially slide rock and steep country, are treacherous. Have one hand free to protect yourself against falls or obstructions.

h. WALK--DO NOT RUN DOWN SLOPES.



TRAVEL

FOOT



## 2.32 WINTER TRAVEL --See Avalanche Control Handbook 2332.81

(1) All forest officers who have on-the-ground planning, administrative, or supervisory responsibilities, calling for field work in mountainous snow areas, SHALL have training in winter mountaineering, avalanche hazard recognition, and, where there is a distinct need, training in avalanche control.

(2) When traveling in the winter in snowslide areas, employees SHALL --

a. AVOID IF POSSIBLE TRAVELING IN HAZARDOUS AREAS. IN THE SPRING, SNOWSLIDE HAZARDS ARE EXTREME AFTER 3 OR MORE DAYS OF UNUSUALLY HOT WEATHER.

b. Stay out of snow country for 48 hours after heavy snowstorms or until the new snow bonds with the old.

c. In the spring or during periods of heavy thawing, arrange to travel over snow areas during the early morning hours, because wet snow avalanche hazard increases greatly after 12 noon.

(3) In deep snow and cold weather, travelers should get an early morning start, and make camp early, preferably by 3 p.m., before they get tired.

(4) When traveling on ice, especially shore ice, use a pole to prospect ahead of you; if ice breaks, you can use pole to help you get out of the water.

(5) Sunglasses SHALL be carried when traveling during the winter. These SHALL be worn to protect the eyes from sun glare in open snow country.



HSC 5.53

## 2.33 EMERGENCIES

(1) If you get lost, keep calm. Don't walk aimlessly. Trust your map and compass. Shelter and warmth are much more important than food.

a. Climb to where you can see surrounding country to orient yourself.

b. Select a sheltered spot and prepare camp, shelter, and firewood before dark.

c. When you reach a road, trail, or telephone line, follow it. As a last resort, follow a stream downhill.

d. After unsuccessful attempts to find your way, stay in one place, conserve your strength, and build a fire so that smoke can be seen by searchers.



(2) If you are injured and alone, keep calm. Stay where you are, and build a signal fire by placing green boughs on a hot fire. Usually someone will find you.

## 2.34 POISON PLANTS, INSECTS, AND SNAKES

## First Aid Guide

(1) Ivy, Oak, and Sumac:

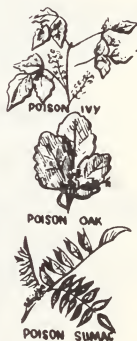
a. All employees subject to exposure to these hazards SHALL be instructed in plant identification.

b. Highly sensitive persons should not be exposed.

c. When working in affected areas, employees SHALL--

1. Fasten trouser legs closely over boot tops, and tuck them in.

2. Wear gloves, and keep them away from face or exposed parts of the body.



3. After work, wash exposed parts thoroughly with thick soap-suds (yellow laundry soap is best) in hot-test possible water, the apply alcohol.

4. Clean tools with cleaning solvent before putting them away.

5. Wash exposed clothing in thick hot suds separately from other clothes.

d. Poisonous plants SHALL be destroyed around improvements where practicable.

1. Use Ammate; 2, -4-D; 2, -4, -5-T; or 2, -4, -5 to kill plants.

2. Burn only in isolated areas.

3. Avoid contact with smoke; particularly avoid getting it in your eyes or inhaling it.

e. Immunization treatments by a doctor or application of body ointments or salves are recommended.

## (2) Insects:

a. Employees exposed to dangerous infestations of Rocky Mountain spotted fever ticks SHALL--

1. Wear medium high boots, and fasten trousers over boot tops.

2. Avoid walking through low vegetation when possible.

3. INSPECT BODY AND CLOTHING TWICE A DAY WHEN THERE IS A POSSIBILITY OF EXPOSURE TO TICKS.

4. At night, place clothing where ticks cannot get in it; and arrange bed so ticks cannot crawl into it.



2.34(2)5.

2.34(2) 5. If tick is found attached to body, remove it using care to prevent infection through skin abrasions or cuts on fingers. Apply cooking or hair oil to tick for one half hour. Carefully remove tick after oil has loosened its hold.

a. Use tweezers if available.

b. Be sure to remove head of tick.

c. Hold lighted cigarette close to tick to make it release its hold.

6. Take the tick shots if working in tick areas. Facilities should be made available for employees to take shots.

7. Brush seed ticks off trousers with a switch.

8. Use repellants to keep ticks from attaching themselves.

9. See doctor immediately if in tick country and you have fever symptoms: Chill, followed by continued fever, severe headaches, pains in bones and muscles, skin eruptions on third day.

b. Employees exposed to Pajhuello ticks (pa-ha-wel-yo) or other tick bites should follow the same precautions as 1-5, 7-8 provided for under Mountain spotted fever ticks. Treatment for Pajhuello tick bites consists of the following:

1. Remove as much of tick's saliva as possible using suction cups or mouth for 20 minutes. Avoid making incisions. (Pajhuello tick bite symptoms include a dark purple ring or eruption around the wound.)

2. Apply antiseptic and sterile dressing.



3. Persons with pronounced allergic response may experience a systematic reaction requiring treatment for shock.

4. Obtain medical treatment if irritation persists.

c. Employees exposed to chiggers  
SHOULD--

1. Avoid sitting on ground or on logs and avoid low vegetation when practicable.

2. Apply powdered sulfur to legs and hands.

3. Bathe in hot, soapy water.

4. Use insect repellents such as dimethyl phthalate, indalone.

d. In black widow spider areas, employees SHOULD--

1. Wear work gloves.

2. Turn them inside out after placing them on ground temporarily.

3. Inspect material before handling.

4. Be careful in outdoor toilets.

5. If any bite shows rapid inflammation and pain, see doctor.

(3) Snakes:

a. Employees SHALL--

1. WEAR HIGH BOOTS  
IN POISON SNAKE COUNTRY.

2. Be careful around places obscured by foliage or otherwise when walking in rocky country or climbing ledges.

3. Use a bar for moving materials and timber that have been stacked or piled in snake areas. Do not put hands under any stored material where snakes might be present.



2.34(3)a. 4.

2.34(3)a. 4. Take care not to step over any logs. Step on them and look down before stepping off.

5. If bitten, remain quiet and, if possible, avoid movement under your own power. If necessary to walk, move slowly with frequent rests.

6. Carry a snakebite kit in poisonous snake infested areas. It should be used only if unable to get to a doctor or hospital within an hour.

7. Anti-venom is the best treatment.



First Aid  
Guide





## 2.4 ANIMAL

### 2.41 SELECTING STOCK

(1) Only animals showing or known to have no dangerous habits SHALL be accepted.

(2) Every reasonable effort SHALL be made to discover dangerous habits of strange animals.

(3) Only experienced men SHALL break horses of dangerous habits.

(4) If dangerous habits cannot be corrected easily, the animals SHALL be removed from service.

(5) Stock rented or furnished by seasonal workers SHALL be gentle and properly broken.

(6) The Service SHALL NOT hire untrained or "spooky" animals that might injure those riding or working with them.

(7) Only thoroughly experienced persons SHALL be assigned the job of breaking and training saddle and pack stock.



### 2.42 ASSIGNING STOCK

(1) No animal known to be dangerous SHALL be assigned to a forest officer.

(2) Only gentle, well-broken stock SHALL be assigned to inexperienced personnel.



2.42(3)

2.42 (3) Inexperienced personnel SHALL be given adequate instructions before they are allowed to handle stock.

(4) Forest officers SHALL assign stock only to those who can handle them.

(5) Special instructions SHALL be issued on handling animals suspected or known to have annoying or tricky habits.

ANIMAL LOG	
NAME:	AGE:
WEAKNESSES:	
INJURIES:	
HABITS:	

## 2.43 HANDLING STOCK

(1) Employees SHALL keep cool, move quietly, speak softly, and treat kindly but firmly, with confidence

(2) Animal SHALL be spoken to when approached; avoid approaching from the rear, if possible.

(3) All animals SHALL be given especially careful handling after prolonged layoffs.



(4) An animal SHALL always be led around after being saddled, and before being mounted or packed.

(5) A firm hold SHALL be kept on reins or lead rope; never wrap them around your hand.

(6) Too much gear and equipment SHALL NOT be carried on a saddle horse; tools and equipment SHALL NOT be carried in your hands while riding horseback.

(7) Excess lead rope that may become entangled with hands or feet SHALL be avoided. It should be not less than 9 feet nor more than 16 feet in length.

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(8) When trying a horse, employees SHALL--

a. Avoid slack that might entangle horse or man. Tie with not more than 4 feet of slack and make the tie at least 4 feet above the ground.

b. Never tie to a barbed wire fence.

c. Always stay away from a position directly in front of a solidly tied animal.

d. Whenever possible, tie an animal to an object he cannot walk completely around.

e. Use a bowline knot around horse's neck. Use a halter if horse is to be tied for long periods. Use a rolling slip knot around the object to which the horse is to be tied.



(9) Stock SHALL be kept away from all types of loose wire.

(10) The services of a qualified veterinarian SHALL be secured if horse is ill or seriously injured.

(11) A sweaty horse SHALL NOT be fed or watered until it has cooled off.

(12) Ask an experienced stockman for advice.

## 2.44 RIDING A HORSE

(1) When saddling the horse, make sure rigging, latigos (cinch strap), and cinches are in a safe, usable condition.

(2) Western riding boots, field boots, or workshoes SHALL be worn. Avoid using a type of shoe that may hang in stirrup.



2.44 (3) Snug-fitting clothing SHALL be worn. Chaps should be worn when riding in brushy country.

(4) Before mounting, rider SHALL--

- a. Lead horse a short distance after cinching.
- b. Check cinch again.
- c. Head horse parallel to hill so horse's left side is uphill, on level ground head horse 90° to the right of the direction the rider intends to take.
- d. Take up slack in reins.
- e. Before mounting, check stirrups for correct positions. Stand opposite and close to left shoulder, facing animal's rear; take mane or saddle horn in left hand, gripping reins firmly, near rein tight, off rein slack, so that twist of wrist can pull horse to you if he becomes unruly; turn near stirrup toward rider's left foot; grasp saddle horn with right hand and swing into saddle quickly but lightly. Avoid scratching horse with spurs or heels when mounting.
- f. Insert only toe of boot into stirrup when mounting. Don't shove feet clear into stirrups. If you are wearing field shoes, ride on balls of feet, not in the insteps.



(5) When riding, rider SHALL--

- a. Be alert to animal's movements and guide him firmly but gently. Test his reining habits. Don't hold a tight rein unless necessary to restrain his forward movements.
- b. Never wrap or tie reins around the saddle horn.
- c. NEVER RIDE HORSE WHEN LIGHTNING STORM IS NEARBY OR OVER-HEAD. HSC 3.4

d. When off horse, check position of blanket and saddle, tightness of cinch. Look for worn or broken straps, cinches, rein, and in brushy country for trash under blanket.

e. Always keep lead ropes free when leading stock from a saddle horse. Never tie the lead rope around the lead horse's saddle horn or wrap rope around hand.



f. In dismounting, move left foot back so ball of foot is in stirrup before swinging off to prevent a hung foot.

g. Always get off and lead a horse across excessively rocky or very steep terrain and corduroy, or pole bridges, where a horse has poor footing.

h. Watch the slack in the lead rope to avoid animal's straddling or stepping over it, and to keep it from getting under the lead horse's tail.

i. Never run a horse on hard pavement, frozen ground, or uphill.

j. Never shoot firearms while on horseback.

## 2.45 PACKING

(1) All pack animals SHALL be treated as dangerous until they are proved reliable.

(2) Inexperienced persons SHALL keep away from pack stock being loaded or unloaded, unless asked to help and instructed on how to do it.

(3) Animals SHALL be tied short to a solid post or hitching rack, with heads pulled slightly up.

(4) Lash and swing ropes SHALL be coiled and hung on pack saddles until actual packing begins, and immediately after unloading.

(5) A pack string SHALL be tied together with rope so animals can break apart in case of accident. The halter rope of the mule behind SHALL be tied to the pigging rope loop on the back of the pack saddle of the mule ahead with a pigtail tie.

## 2.45(6)

2.45 (6) The animal's back SHALL be clean; saddle pad straight; saddle blanket smooth; saddle tight and properly fitted, and the side packs balanced, before pack is put on.

## 2.46 WORKING WITH ANIMALS OTHER THAN SADDLE OR PACK STOCK

(1) Livestock SHALL be securely held in chutes or securely tied with ropes before they are eartagged, dehorned, vaccinated, or branded.

(2) Employees SHALL always be on guard when in a corral with livestock.

(3) Extreme caution SHALL be exercised in the presence of bulls or stallions.

(4) Employees SHALL let livestock know they are around. Do not walk up to them unexpectedly.

(5) Rope attached to animal SHALL NOT be looped around the hand.

(6) When a horse or team is being used for skidding, they shall either be led by the bridle or SHALL be driven, with long reins that will permit the driver to stand to the rear of the horse and if possible to the rear or well to the side of the object being skidded.

## 2.47 ANIMAL HAULING

(1) At regular loading locations, a loading ramp with cleats to prevent slipping SHALL be constructed, level with bed of truck.

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ANIMAL



(2) Floor of truck or trailer SHALL be cleated or covered to insure firm footing, and inspected frequently for loose or rotten boards and protruding nails.

(3) Side boards or rack SHALL be substantial to discourage animals from breaking out or climbing over the sides.

(4) Animal's halter SHALL be used during hauling. Fasten head securely. Tie-down ropes, safety harnesses, and straps over horses' backs SHALL be used on all horses that have habit of jumping out of single trucks or trailers. Horse SHALL be untied before the tailgate is lowered.

(5) In loading horse, avoid getting into trailer ahead of horse, if possible. If it is necessary, then stand on opposite side of divider bar in two-horse trailers or get on deck at front of trailer. When horse is loaded: first, close tailgate immediately; second, hook divider chains on two horse trailer; third, tie animal securely.

(6) Unloading horse: first, drop divider bar chains; second, untie horse; third, open tailgate and stand clear. When in doubt about horse's training, first drop divider bar, open tailgate and then untie horse.

(7) When tying animals, fingers SHALL be kept out of loops. Use a rolling slip knot or a hitching rack tie and take up excess rope on outside of trailer with a pigging tail tie.

(8) Trailer SHALL be level with tailgates resting evenly on ground before loading or unloading.

(9) Stand at one side when raising or lowering tailgate.

2.47(10)

2.47(10) Windshield or goggles  
SHALL be provided for horses.

(11) Loose gear SHALL NOT be  
carried in truck or trailer with ani-  
mals.

(12) Quick stops and starts  
SHALL be avoided.

(13) Worker SHALL NOT ride horse into trailer  
for loading.

(14) Two animals SHALL be hauled in trailer only  
where there is a bar or partition between them.

(15) Trailer hitch and auxiliary  
safety tow chains SHALL be secure  
before starting.

(16) Driver SHALL learn to back  
an empty horse trailer before at-  
tempting to back trailer with horse in  
it.

(17) Horse trailers SHALL be  
towed no faster than 40 MPH.

(18) Horse trailer designed to carry more than 1  
horse SHALL be equipped with electric or air brakes.

(19) Trailer brakes and lights SHALL HSC 2.14  
be tested prior to starting.



## 2.48 SHOEING

(1) Shoeing SHALL be done by an experienced person. All employees who are required to use a horse should be given instructions on how to shoe horses.



(2) Horseshoers should wear leather chaps or leather apron, and hard-toed shoes.

(3) If horse is hard to shoe and can't be readily trained, he SHALL be replaced.

(4) Nails SHALL be bent over and cut off promptly after being properly seated.







## 2.5 WATER TRAVEL

### 2.51 GENERAL

(1) MEN WORKING OVER SWIFT OR DEEP WATER OTHER THAN ON PLATFORMS, OR ON SCAFFOLDS EQUIPPED WITH GUARDRAILS, SHALL WEAR LIFEJACKETS OR LIFEBELTS, OR HAVE LIFELINES ATTACHED TO THEMSELVES.



(2) When swimming, the buddy system SHALL be used. Have another fellow with you at all times. Also:

- a. Wait an hour after meals before swimming.
- b. Do not swim if overheated.
- c. Never dive into strange water.

(3) Clothing that can be removed easily should be worn.

### 2.52 PERSONAL PROTECTION

(1) All boats SHALL be in first-class condition.

(2) BOATS SHALL BE MANNED BY EXPERIENCED BOATMEN. Regions and Stations should qualify watercraft operators to handle various size boats under their operating conditions.



(3) BOATS SHALL NEVER BE OVERLOADED. A SAFE MARGIN WELL BELOW THE DANGER POINT, CONSIDERING WEATHER AND OTHER CONDITIONS

SHALL ALWAYS BE MAINTAINED. THE MAXIMUM SAFE LOAD LIMIT SHALL BE PLAINLY POSTED ON EACH BOAT UNDER 22 FEET IN LENGTH.

(4) Somebody in the boat party SHALL be able to apply artificial respiration. First Aid Guide

(5) Men who are habitually sent out in boats SHALL be able to swim. HSC 1.11

(6) A LIFE PRESERVER FOR EACH PERSON IN A BOAT SHALL BE READILY ACCESSIBLE AT ALL TIMES. A LIFE VEST OR BELT SHALL BE WORN WHILE OPERATING IN CANOES, RAFTS, SKIFFS, AND ALL TYPES OF BOATS UNDER 22 FEET IN LENGTH, UNLESS MODIFIED BY THE REGIONAL FORESTER.

(7) Avoid traveling in skiffs (rowboat) on exposed water and in heavy tidal currents.

(8) Never swim for a skiff anchored out of reach at high tide.

(9) Travel between vessels and shore SHALL NOT be attempted in rough seas.



(10) Never travel alone in a skiff on long journeys.

(11) The boat operator SHALL be responsible for safety practices on his vessel.

(12) Rubber boats or liferafts over 5 years old SHALL be declared unserviceable.

(13) All boats and vessels SHALL be equipped and operated in accordance with U.S. Coast Guard and/or state rules and regulations for boats operating on inland waters.

## 2.53 EMERGENCY PROCEDURES

(1) Travel SHALL NOT be done during periods of high winds and rough water, or if a storm threatens. If caught in a storm, keep the bow to the sea and reduce speed; beware of broaching to; and lower the center of gravity for a canoe by kneeling on the bottom.

(2) If your boat capsizes and you cannot get a life preserver, discard your heavy outer clothing and shoes, if possible. Hang on to boat, oar, or anything else that is floating nearby until help comes. Don't get panicky.



(3) Do not attempt to swim to shore from an overturned craft. Hang onto the craft until it drifts or can be paddled to shore, or until help arrives.

## 2.54 MANUALLY OPERATED WATERCRAFT

(1) Unless watercraft and canoes are capable of floating when capsized, they SHALL be equipped with air tanks capable of floating the craft when full of water. A bailing can SHALL be carried.

(2) Training in boat and canoe handling SHALL be given new men in sufficient amount to insure that they can operate safely on their own, for planned projects demanding their use of small crafts. They SHALL be trained in resuscitation. They should be able to swim.

2.54(3)

2.54(3) A lifebelt or vest SHALL be worn while on the water in any small boat or canoe.

(4) The loading SHALL be balanced evenly between port and starboard, and fore and aft to the extent that the keel has a good bite in the water and the craft is well trimmed for safe handling. Cargo SHALL be so loaded and secured that it will not shift when the craft is in motion. Where possible, always load and unload from the side rather than over an end. Do not tie so much cargo to the craft that it will fail to float if it capsizes.

(5) When possible, a canoe SHALL be entered or left from the side rather than the ends, and always step in the center of the craft. Steady yourself while moving in a canoe by placing one hand on each gunnel.

(6) Employees SHALL NOT stand up, change places, or make sudden moves in a boat or canoe. Go to shore if it is necessary to change places, repair motor, or change position of cargo.

(7) When using an anchor, it SHALL be attached to the bow of the craft and not to either side. Exercise care in releasing and raising the anchor.

(8) Interior bottoms of metal and plastic craft should be given a coat of skidproof paint.

(9) The bowman SHALL be the principal lookout for submerged hazards, of which there are a great many in our lakes and streams, that can damage or capsize watercraft or injure propellers. The passengers in midship positions should not move about in an attempt to participate in the lookout's job.

TRAVEL

WATER

(10) A light SHALL be carried when traveling at night to show your position, to check obstructions, to assist in landing and takeoff, to read map and compass, etc.

(11) Passengers SHALL remain seated while boat is in motion. Skylarking in boats SHALL be strictly prohibited.

(12) Oars and oarlocks SHALL be in good condition. Oarlocks should be fastened to boat. Spare oars and oarlocks SHALL be carried on long trips.

## 2.55 POWER VESSELS UNDER 22 FEET

(1) Boats SHALL be properly powered to provide maximum efficiency and safety. Unit supervisors should specify maximum power limits on type of craft used.

(2) A fire extinguisher SHALL be carried on all powered boats except open skiffs and similar craft.

(3) If spare gasoline is carried, it SHALL be in a safety can.

(4) An engine SHALL be refueled only when it is not operating.

(5) Only experienced persons should make surf landings except in emergencies.

(6) Watercraft not equipped with life boats SHALL be equipped or designed to be sufficiently buoyant and capable of floating when swamped or capsized. Life-vests or belts SHALL be available for each person and SHALL be worn in rough water.

(7) Boats SHALL be equipped with materials for patching holes in hulls.

## 2.56 POWER VESSELS 22 FEET AND OVER

(1) Safety regulations as required by the U.S. Coast Guard and Steamboat Inspectors SHALL be posted.

(2) Forest Service power boats SHALL be operated only by physically fit employees who have current licenses covering the classes of vessel and the waters of navigation.



(3) Clear instructions for starting and operating the main and auxiliary engines, anchor gear, radio, etc. SHALL be prepared and conspicuously posted so that in case of emergency the vessel may be moved by someone other than the Marine Engineer.



(4) All permanent personnel who regularly travel on boats SHALL learn to start and operate the main and auxiliary engines, anchor gear, radio, etc., for emergency, frequently enough to assure retention of the ability. Marine Engineers SHALL act as trainers.

(5) While taking on fuel--

- a. Fires SHALL be extinguished.
- b. Motors SHALL be stopped.
- c. There SHALL be no smoking.
- d. Open flame lights SHALL NOT be allowed.
- e. All portholes within 6 feet of filling intake SHALL be closed.

(6) Operators SHALL--

- a. Know and comply with all navigation regulations.

TRAVEL

WATER

2.56(6)b

2.56(6) b. Currently check all safety equipment, salt water intakes, and horns to insure serviceability. Lights SHALL be checked before they are used.

c. Check all ports, batten the hatches, and make all deck gear fast before putting to sea.

d. Allow no one on deck in rough weather unless absolutely necessary.

e. Keep engine room and bilges well ventilated.

f. Keep stove and exhaust pipes insulated and free from soot and carbon.

g. Keep decks free from oil, grease and unnecessary equipment.

(7) Fuel and water tanks SHALL be inspected and tested annually when ship is overhauled.

(8) When vessel is on the ways, zinc plates SHALL be renewed, fastenings SHALL be inspected for electrolytic action, and all sea cocks and underwater inlets and outlets SHALL be checked.

(9) Standard safety equipment SHALL be:

a. Sufficient life boat capacity for all passengers. Life boats equipped with outboard motors, oars, and survival kit (in Alaska waters). An additional lifeboat will be available for personnel who stay aboard.





b. Life preservers for all persons abroad to be readily accessible and their location clearly marked. In addition, provide sufficient lifejackets or vests for skiff or lifeboat use.

c. One cork life-ring on each side of pilot house with at least 10 fathoms of buoyant line attached.

d. Suitable anchor gear including sufficient chain and proper size anchor.



e. Fire extinguishers--for boats--

1. Gas powered--two 2 1/2 pound or larger CO<sub>2</sub> or dry powder plus automatic 10 pound CO<sub>2</sub> flood system for engine room.

2. Diesel powered--one 4 pound and one 10 pound CO<sub>2</sub> or dry powder.

f. Fire extinguisher for boats over 40 feet in length--two in engine room (one of which SHALL be a 2 1/2 pound CO<sub>2</sub> type) and one each of 2 1/2 pound or large size CO<sub>2</sub> or dry chemical type for galley, pilot house, rear compartment and forward compartment. In addition, vessels powered with gasoline engines SHALL have one CO<sub>2</sub> extinguisher of not less than 10 pounds capacity, installed with the nozzle gunned into the bilge beneath the engine ready for instant release.

g. First aid kit.

h. Three flashlights of at least 2-cell size.

i. Supply of caulking, canvas and sheet lead for emergency repairs on wood vessels over 40 feet in length.

## 2.57 SCOWS

(1) Bilges SHALL be checked and pumped before making tows.

(2) Scows SHALL be loaded evenly, with load well lashed.

TRAVEL

WATER



## 2. 57(3)

2. 57 (3) When towing, check SHALL be made frequently for shifting of cargo or change of draft due to water in the bilge.

(4) Hatches SHALL be kept battened and manhole plates SHALL be secured.

## 2. 58 WANIGANS (Houseboats)

(1) Life preservers SHALL be provided, accessible to all men abroad.

(2) All compartments SHALL be equipped with fire extinguishers.

(3) First aid kits SHALL be kept well stocked.

(4) Stoves and chimneys SHALL be kept clean, free from soot, and properly insulated.

(5) Escape hatches SHALL be kept free and accessible.

(6) When wanigan is anchored and men are living aboard, a skiff with oars SHALL be kept aboard for emergency use.

(7) Gasoline SHALL NOT be stored, mixed, or handled inside a building.

## 2. 59 ICE SAFETY

(1) Employees SHALL stay off dangerous ice.

(2) If alone when you fall through ice, put arms in front of you on solid ice, kick to keep body level, crawl forward on stomach until hips reach ice, then make quick full length roll onto ice. Keep rolling until safe. If ice is too thin to support you, break way to shore with one hand, supporting yourself with the other.

(3) When somebody falls through the ice, warm and dry him as soon after rescue as possible. Do not delay doing this by trying to get him to camp or home if the distance is great.

(4) Rescuers should try to reach victim with pole, board, rope. Walking to ice edge is dangerous and SHALL be a last resort. If necessary to do so, carry a long pole with you or push yourself to the edge in a prone position. Be careful to avoid a double casualty.



(5) Ice harvesting:

a. Workmen SHALL be provided with ice creepers to overcome slippery footing unless slippery ice conditions can otherwise be prevented satisfactorily.

b. Slides of sufficient strength SHALL be provided, with sideboards to prevent cakes from sliding off.

c. Ice cakes SHALL NOT be lifted onto the trucks or into ice houses.

d. Maximum size of ice cakes SHALL be 18 by 24 inches for hand loading and handling.

e. Ice should be of uniform size, with any irregular edges chiseled off to prevent hazards in handling.

f. Power-driven, ice-sawing equipment SHALL be used only by employees previously trained and fully experienced in handling such equipment.

## 2.6 SNOWPLANE TRAVEL

(1) Snowplanes SHALL be inspected and approved by a qualified inspector designated by the Region Forester or Director before being used on official business.

(2) Snowplane inspector SHALL ascertain that approved snowplanes are equipped as follows:

a. The plane SHALL be equipped with a guard that will protect the operator and passengers from propellor injury in case of accident or propeller failure.

b. The plane SHOULD have a well-kept appearance, be clean, and motor SHOULD have no noticeable oil or gas leaks.

c. The propeller SHALL be in first-class condition. The large propeller nut and propeller bolts SHALL be keyed and locked in place.

d. The plane SHALL be equipped with a windshield.

e. The body of the plane SHALL be properly covered. Any holes in the metal or material covering are a hazard.

f. Skis must be constructed of good strong material.

g. Skis SHALL have a turnup of at least 10 inches high.

h. Skis SHALL be a minimum of 6 feet in length.

i. The steering mechanism SHALL be free of excessive play or looseness.

(3) The operators of snowplanes SHALL be experienced individuals, have good judgment, be in good physical condition and preferably acquainted with the country. They should be experienced in using skis and snowshoes and equipped for winter travel on foot. HSC 2.3

(4) The inspector SHALL check the snowplane performance and the operator's capability.

(5) Loose equipment such as snowshoes, packsacks, etc. SHALL be securely tied in place when the snowplane is in motion.



# CHAPTER

# 3

## Fire



Fire Fighting



Building Protection



Flammables



Lightning



## CHAPTER 3. FIRE

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## 3.1 FIRE FIGHTING

### 3.11 GENERAL

HSC 9.12

(1) These three basic principles SHALL be observed on all fires, regardless of size or manning:

a. RECRUITMENT--NO WORKERS OR OVERHEAD SHALL BE ASSIGNED TO FIRE DUTY IF THEY ARE UNDERWEIGHT, OVERWEIGHT, OR HAVE HEART, LUNG, OR INTESTINAL DEFECTS.

1. THEY SHOULD BE AT LEAST 18 BUT NOT OVER 60. HSC 9.11  
9.12

2. MEMBERS OF ORGANIZED CREWS USED REGULARLY IN FIRE SUPPRESSION WORK SHALL BE REQUIRED TO PASS A PHYSICAL EXAMINATION EACH YEAR, REGARDLESS OF AGE.

3. FIREFIGHTERS MUST BE PROPERLY CLOTHED. THIS INCLUDES WEARING HARD HATS, LONG SLEEVED SHIRTS, GLOVES AND LACE LEATHER BOOTS OR SHOES THAT COVER THE ANKLES. HSC 5.12(1)

b. TRAINING--ALL WORKERS SHALL BE INSTRUCTED ON AREA HAZARDS AND SAFE WORKING PRACTICES BEFORE STARTING WORK. OVERHEAD SHALL KNOW THESE PRACTICES FROM EXPERIENCE AND/OR TRAINING. THE CREW BOSS AND OTHER OVERHEAD SHALL BE IDENTIFIED FOR READY RECOGNITION BY ALL FIRE FIGHTERS. FIRE FIGHTERS SHALL UNDERSTAND THE CREW BOSS'S AUTHORITY TO ISSUE INSTRUCTIONS AND SHALL FOLLOW INSTRUCTIONS AT ALL



TIMES, PARTICULARLY DURING EMERGENCIES. INSTRUCTIONS SHALL BE CLEAR CUT AND RE-PEATED UNTIL UNDERSTOOD.

c. ESCAPE AND LOOKOUT PLAN--ESCAPE ROUTES SHALL BE PICKED TO AVOID TRAPS. CREW BOSSES AND SQUAD BOSSES SHALL THOROUGHLY INSTRUCT MEN ON ESCAPE ROUTE USE. IN HIGH HAZ-ARD AREAS, ESCAPE ROUTES SHALL BE PREPARED IN ADVANCE BY CUTTING WAYS OR MARKING ROUTES SO THERE SHALL BE NO MISTAKE DURING CRITICAL WORK SITUATIONS. LOOKOUTS SHALL BE POSTED IN POSITIONS SEE-ING DANGER POINTS AND WITH PROVISIONS FOR PROMPT COMMUNICATION WITH CREW TO--

1. WARN MEN OF FALLING TREES, ROCKS AND SNAGS.

2. KEEP WATCH AND WARN MEN IN CASE OF BLOWUP. IN ADDITION, ALL WORKERS AND OVERHEAD SHALL BE INSTRUCTED TO WATCH FOR ALL HAZARDS, SUCH AS BLOWUPS, ROLLING LOGS OR ROCKS OR FALLING TREES, SNAGS, OR BRANCHES. Signals SHALL be pre-arranged for crewmen to use as warn- ing for falling snags or rocks. Ex- amples: For snags or limbs, "Tim- ber." For rolling rocks or logs, "Heads up."



(2) Full-time safety officers shall be assigned to large or dangerous fires to check and take any corrective action as may be indicated for safety of men on all parts of the fire or in specific problem areas that the fire boss may designate; to

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help screen the physically unfit; to survey fireline, fire camp, and transportation hazards; and to determine how to remove them; to check on Health and Safety Code compliance, safety instructions, the fatigue factor, safety equipment, first aid, medical and sanitation facilities; to investigate accidents; and otherwise to assist the fire boss with safety.



(3) Where blowup potential exists, a qualified fire behavior officer SHALL be assigned to identify especially hazardous situations.

(4) SITES FOR RESTING, LUNCHING, OR BEDDING DOWN SHALL BE SAFE FROM RUNNING FIRES, AIRCRAFT, FALLING TREES, ROCKS, SNAGS, VEHICLES, AND PACK STOCK. IF NECESSARY TO SELECT UNSAFE SITE, IT SHOULD BE LOCATED SO AS TO PROVIDE A VANTAGE POINT OR A LOOKOUT SHALL BE POSTED.



(5) WHEN POSSIBLE, NIGHT CREWS WILL ARRIVE AT THEIR WORK AREAS IN DAYLIGHT SO THAT DANGEROUS PLACES SHALL BE SPOTTED BEFORE THEY GO ON NIGHT DUTY. WHEN THIS IS NOT POSSIBLE, LOCAL FIRE FIGHTERS FAMILIAR WITH THE TERRAIN OR OVERHEAD FROM PREVIOUS SHIFTS WILL BE USED. MEN SHALL BE WARNED OF UNSAFE WORKING CONDITIONS. OVERHEAD SHALL BE ALERT TO ELIMINATE HAZARDS.



3. 11(6)

(6) MEN SCOUTING OR WORKING AHEAD OF A CREW IN BRUSHY TERRAIN SHALL CARRY A CUTTING TOOL AND CLEAR ANY VEGETATION WHICH MIGHT HAMPER ESCAPE. A LOOKOUT SHALL BE POSTED TO WARN OF DANGER WHEN MEN ARE SCOUTING IN UNBURNED AREA OF DENSE VEGETATION.

(7) FREQUENT CHECKS BY CREW AND SQUAD BOSSES SHALL BE MADE TO BE CERTAIN THAT ALL MEN ARE SAFE; THIS IS PARTICULARLY APPLICABLE IMMEDIATELY AFTER A FLAREUP.

(8) MEN SHALL BE WARNED TO BE ESPECIALLY CAUTIOUS NEAR HIGH TENSION LINES BECAUSE A LIVE WIRE MIGHT BE ON THE GROUND.

HSC 8. 24

(9) REASONABLE REST PERIODS SHALL BE PROVIDED, ESPECIALLY AT HIGH ELEVATIONS AND ON HOT DAYS. SOME RESERVE STRENGTH SHOULD BE KEPT FOR EMERGENCY. SUCCEEDING SHIFTS SHOULD NOT EXCEED 12 HOURS TIME PLUS NO MORE THAN 2 HOUR TRAVEL WITH NOT LESS THAN 8-HOUR REST PERIODS BETWEEN SHIFTS.

(10) PROMPT FIRST AID SHALL BE GIVEN FOR ALL INJURIES, ESPECIALLY FOR BURNS AND SHOCK. EXPERIENCED FIRST AID MEN AND ADEQUATE FACILITIES SHALL BE ASSIGNED TO EACH FIRE CAMP. A DOCTOR OR INTERN SHALL BE IN CHARGE WHEN POSSIBLE.



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(11) FIRE WEATHER FORECASTS SHALL BE STUDIED AND FULLY UTILIZED BY ALL OVER-HEAD ON THE FIRE. REMEMBER THAT WEATHER CONDITIONS AND FORECASTS CAN BE MISLEADING AND MUST BE ANALYZED THOROUGHLY BY TRAINED PERSONNEL.

### 3.12 FIRE FIGHTING PRACTICES

(1) MEN OR MACHINES SHALL NOT WORK DIRECTLY ABOVE ONE ANOTHER OR AT CLOSE INTERVALS WHEN WORKING ON STEEP SLOPES.

(2) THESE SAFETY MEASURES SHALL BE OBSERVED--

a. PASS A BURNING OR FIRE-WEAKENED TREE ONLY ON THE UPHILL SIDE OR ABOVE THE LEAN, AND THEN WATCH IT CLOSELY.

b. ALLOW ONLY SNAG CREW IN SNAG-FALLING AREA.

c. IN FAST BURNING FUELS, WATCH OUT FOR FAST RUNS IN ANY DIRECTION, AT ANY TIME DAY OR NIGHT. IF AN EFFORT TO CUT ACROSS THE HEAD INVOLVES SLOW ACCESS AND RETREAT, RESORT TO CONTROL BY FLANK ATTACK, STARTING AT A SAFE SECTOR.

d. PATROL BELOW FOR SPOT FIRES FROM HOT MATERIAL ROLLING DOWN. SPOT FIRES BELOW A CREW CAN RACE UP SLOPE.

e. SLOPES CAN BECOME EXPLOSIVE AT ANY TIME, DAY OR NIGHT. THE SAFEST PLACE TO FIGHT A FIRE IS IMMEDIATELY AGAINST IT. IF FIRE STARTS ACROSS THE LINE BEHIND YOU AND YOU ARE CUT OFF, GET IN THE BURNED AREA.



3.12(1)f.

3.12(1) f. IF IMPOSSIBLE TO GET INTO THE BURNED AREA, PAUSE TO SIZE UP THE SITUATION, THEN ACT IN A POSITIVE PLANNED MANNER. MAKE YOUR INSTRUCTIONS CLEAR. CONTROL THE MEN UNDER YOU. USE FIRE ESCAPE SHELTER AS LAST RESORT.



g. PANIC LEADS TO TROUBLE. Keep a clear mind and act with cold, deliberate logic.

(3) Dozers should not be assigned to fireline unless under direct supervision of competent overhead. Guides or spotters ahead of fireline dozers SHALL be selected for their physical fitness as well as other qualities; and they SHALL be specially instructed on job requirements. At night, the dozer guide should wear two headlights, one shining to the front and one to the rear, so that the operator can see him at all times.



(4) Men SHALL stay clear of a dozer in operation instead of depending on the dozer operator to keep away from them. Because of the danger of rolling material, men should not work below a dozer.



(5) IN DOZER OPERATIONS IN ADVANCE OF FIRE, A SAFETY STRIP SHALL BE BUILT FOR RETREAT IN CASE THE FIRE MAKES A RUN. THIS IS ESPECIALLY NECESSARY WHEN WORKING ALONG A RIDGETOP ABOVE FIRE IN CANYON BELOW.

(6) FAST TRAVEL THROUGH DENSE UNBURNED BRUSH OR REPRODUCTION, OR OVER ROCKY GROUND IS PRACTICALLY IMPOSSIBLE.

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(7) FIRE FIGHTERS SHOULD NEVER TRY TO OUTFRAN THE HEAD OF A FAST MOVING FIRE. TRY TO GET TO THE FLANKS. IF IT IS NOT POSSIBLE TO GET INTO THE BURNED AREA, THE SAFEST ROUTE MAY BE UPHILL, DOWNHILL, OR ALONG THE CONTOUR OF A SLOPE DEPENDING ON YOUR LOCATION, BEHAVIOR OF THE FIRE, AND THE SPEED YOU CAN SUSTAIN UNDER EXISTING CIRCUMSTANCES.

Do not outrun  
HEAD of FIRE



SPEED away from  
fire DIRECTION



FOLLOW  
INSTRUCTIONS



(8) Emergency procedures to be followed if surrounded or cut off by fire--

a. Follow crew boss's instructions. Keep fire tool.

b. Set escape fire and get inside burned-over area.

c. Move to barren area, if slope is flat, dig in as much as possible. On ridge top, keep on side opposite from fire.

d. On road, lay down, inside cut bank if possible. Keep face buried in arms.

e. In all cases, protect face and head areas, cover face with wet handkerchief. Keep canteens or dirt ready to put out sparks in clothing. Shield lungs against hot gases.

GET INSIDE  
BURN



(9) TEN STANDARD FIRE FIGHTING ORDERS

a. Keep informed on fire weather conditions and forecasts.

b. Know what your fire is doing at all times--observe personally, use scouts.

Man in Ditch



3.12(9)c.

3.12(9) c. Base all actions on current and expected behavior of fire.

d. Have escape routes for everyone and make them known.

e. Post a lookout when there is possible danger.

f. Be alert, keep calm, think clearly, act decisively.

g. Maintain prompt communication with your men, your boss, and adjoining forces.

h. Give clear instructions and be sure they are understood.

i. Maintain control of your men at all times.

j. Fight fire aggressively but provide for safety first.

(10) LOOSE ROCKS ALONG PREVIOUSLY CONSTRUCTED DOZER BREAKS SHALL BE EXAMINED BY CREW BOSS AND ROLLED DOWNHILL OR STABILIZED BEFORE CREW WORKS BELOW THEM.

(11) UNDER NORMAL DANGER OF ROLLING ROCKS AND LOGS, THE CREW BOSS SHALL --

a. KEEP LOOKOUT POSTED

b. SPREAD MEN OUT FURTHER THAN TEN FEET.

c. STAGGER MEN SO THEY ARE NOT WORKING OR WALKING DIRECTLY BELOW EACH OTHER.

d. BRIEF MEN ON WHAT TO DO WHEN WARNING IS GIVEN, i.e., "FACE DANGER: DON'T MOVE UNTIL YOU SEE WHERE DANGER IS COMING FROM."





(12) Under high hazard of rolling rocks, etc., the fireline should be manned only if it can be done safely. If safe manning is considered possible:

a. Assign small groups of trained fire-fighters.

b. Use Buddy System--one man working, one man watching; trade off frequently. Stay alert.

### (13) GROUND ACTION DURING AIR ATTACK.

a. Overhead and fire crews SHALL be alert to low flying aircraft making chemical or water drops.

b. FIRE FIGHTERS SHOULD HSC 2.29  
MOVE OUT OF THE TARGET AREA. IF  
THIS IS IMPOSSIBLE MEN SHALL IMMEDIATELY  
LIE DOWN FACING ONCOMING AIRCRAFT. HARD  
HAT MUST BE IN PLACE.

c. Hand tools should be discarded to the side in as safe a manner as time permits before taking the prone position.

d. When lying on the ground grasp something firm to prevent being carried or rolled about by the dropped liquid.

e. Do not run unless obvious escape is assured.

f. When in timber cover get clear of dead snags, tops and limbs in drop area. Do not remain in area if there are rocks or other material that may be dislodged by the liquid drop.



### 3.13 TRAVEL

(1) Trails and routes SHALL be HSC 2.3  
marked and maps consulted to prevent getting lost.

### 3. 13(2)

3. 12 (2) When moving crew to and from fire, or along the fireline, place responsible individual at head and rear of column to keep crew together and to insure that all members are accounted for at all times.



(3) For night travel use only those lanterns and lights that are in safe condition and that will produce adequate light. IN CROSS-COUNTRY NIGHT TRAVEL, WATCH FOR HOLES SUCH AS MINE SHAFTS, WELLS, LAVA CRATERS, AND GROUND CRACKS. ORGANIZATIONAL CONTROL SHALL BE INTENSIFIED. KEEP MEN CLOSE TOGETHER AND ON THE SAME TRAIL OR PATH. PROHIBIT STRAGGLING.

(4) CLIFFS OR SLIDES SHALL BE CLIMBED UP OR DOWN ONLY AFTER CAREFUL HAZARD SURVEY AND FULL PREPARATIONS HAVE BEEN MADE.



(5) WHEN TRAVELING IN ROCKY COUNTRY, BE ON THE ALERT FOR ANY ROCKS OR LOGS THAT MIGHT BE DISLODGED. STAGGER MEN SO THAT THEY ARE NOT DIRECTLY BELOW EACH OTHER.

### 3. 14 EQUIPMENT

(1) When fire fighting equipment is parked adjacent to roads, the following precautions SHALL be taken to avoid accidents:

a. Cars and equipment SHALL be parked along one side to avoid congestion.

FIRE

FIRE FIGHTING



b. Tank-truck operators SHALL be trained to operate pumps as far as possible from the back or the side opposite moving traffic.

c. If the fire is adjacent to major roads, "Fire Danger" or "Fire Ahead" signs SHALL be placed on the road to warn motorists of possible dangers. Flares should be used when visibility is decreased by smoke or darkness. If necessary, men SHALL be posted to direct traffic. Tank

trucks or other fire vehicles subject to HSC 1.11(9) use in major traffic areas should be equipped with a 360° flashing red warning light mounted on the highest part of the vehicle.



(2) Backfiring torches SHALL be used only by trained and qualified workers.

a. Fittings SHALL be kept tight.

b. Straps, fittings, and exterior surfaces of torch SHALL be kept free of liquid fuel and flammable residues.

c. Pack straps SHALL permit rapid removal of torch.

d. Straight gasoline SHALL NOT be used as a fuel, except in gas-generator-type (Hauck) torches especially designed for gasoline fuel.

e. Torch SHALL NOT be opened or refilled within 50 feet of flames, embers, or sparks.

f. If gasoline-oil mix is essential for drip torches and kerosene oil burning flame throwers, the mixture SHALL NOT contain more than one part of gasoline to three parts of diesel or heavier oil.

g. Kind of fuel SHALL be clearly labeled on all torch fuel supply containers.



### 3.14(2)h.

3.14(2) h. The weight of back-pack firing torches SHALL be limited to less than 40 pounds full.

i. Firing torches SHALL be kept out of hotly burning areas.

j. No one with oil on his clothes SHALL use a flamethrower, torch, or approach an open fire.

k. A flamethrower that projects flaming oil SHALL be fired with the wind if possible, quartered or at right angles if necessary, and never against the wind.

l. Ignition end of torch SHALL be held away from body when being lighted.

m. Containers not specifically designed to be used with backfiring torches SHALL NOT be used.

#### (3) Uses of fusees:

a. They SHALL be carried in the hand or in a container, not in clothing.

b. A handle should be made from a stick or a limb.

c. Lighted fusees SHALL be held so that hot slag won't fall on the body.

d. Fusees SHALL be stored in metal containers when not kept in animal-proof enclosures.



#### (4) Use of Firing Pistols or Guns

a. Firing pistols and guns SHALL be used only by trained and qualified workers. They must be handled with same caution given any firearm.

b. Do not load until ready to fire, use only cartridges designed for the particular firearm, and keep device pointed at target.

c. Avoid firing at close range and anticipate irregular or erratic trajectories. Never fire over people nor when they are nearby.

d. Use caution with misfires. Keep device in aiming position for short time before reloading.

e. When firing from helicopter avoid accidental discharge of firearm, or shooting into rotating blades or hitting copter.

### 3.15 BUILDING FIRES

#### (1) Rescue and First Aid

a. Plans for escape from all buildings in case of fire or other emergency should be clearly understood by all persons who may occupy these buildings. This includes keeping calm, knowing exits, knowing where fire extinguishers and water hose are located, and how to use these devices.

b. Personnel should be given basic building fire rescue training. This should include working in teams, protection provided by specially treated clothing, use of wet towels, access to building by regular entrances and by ladders from the outside and use of ropes for guide and re-haul.

c. First aid should be given to rescued victims.

First Aid  
Guide

(2) Buildings should be cleared of all occupants and attack made on the fire as soon as possible provided it is of a size and in a structure where attack is logical and can be made with safety. Frame structures in rural areas usually burn rapidly after the fire burns into the main structure. Where water, apparatus, and help is limited, effort should be expended on saving surrounding buildings other than those on fire.



(3) If a building must be entered, it should be done only after sizing up the situation to determine the important factors of how to

### 3.15(3)

enter, reach objective, and return safely. Opening windows and doors usually create drafts that increase the intensity and rate of fire spread.

- (4) If necessary to ventilate a structure.
  - a. Chop hole in roof.
  - b. Open top floor windows from top.
  - c. Open windows between top and first floors from both top and bottom.
  - d. Open first floor windows from bottom.



- (5) Aim hose at base of flames.

- (6) When a building is completely in flame, all persons should be kept clear of falling debris and collapsing walls.

- (7) Cut off electric and gas supplies to burning structures. This should be done at a main, outside control point. HSC 3.23(14)

### 3.16 MISCELLANEOUS FIRE FIGHTING

- (1) Immediately evacuate all personnel to a safe distance from buildings in which a leak in the liquid petroleum gas system is discovered. Liquid petroleum gas is heavier than air and settles; natural gas rises.



KEY AT "OFF"

- (2) To put out gas fire water should be used to cool area until leak can be shut off or until gas has vaporized, after which dry powder or  $\text{CO}_2$  is effective.

(2) To put out motor fire, turn off ignition and use extinguisher. If extinguisher is not available, smother flames with sand, dirt, blanket, or coat. Water SHALL NOT be used on a gasoline or oil fire.

### 3.17 LOOKOUT JOB

(1) Tower legs, stairway and treads, platform, and railing SHALL be inspected at least twice a year.

(2) Catwalks SHALL be equipped with safety gates to prevent people from falling or stepping into trapdoor opening to stairway. Catwalks and stairways SHALL be protected with woven wire or closely spaced guard rails where children have access to the tower.

(3) Lookout tower SHALL be equipped with drop gate, to prevent people from walking into stair well when trapdoor is open. Drop gate SHALL be hinged off balance so it will automatically drop in place unless fastened open.

(4) Tower radio, telephone, wiring, lightning arrester installation, and ground SHALL be inspected before occupancy, frequently thereafter; and after every lightning storm. Posted rules on Standard Form 901 SHALL be followed during storms.

(5) Do not hurry when going up or down the tower stairway.

(6) Dispatcher SHALL radio or telephone lookouts after storms and before and after they make trips alone, to permit a check on their safety.

(7) "NOTICE TO VISITORS" sign SHALL be posted at the foot of each tower.

HSC 3.3

3.4

8.44





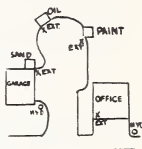


## 3.2 BUILDING FIRE PROTECTION

### 3.21 GENERAL

(1) All dwellings, crew quarters, offices and boats longer than 22 feet SHALL be designed or re-modeled to provide at least two routes of escape for fire emergency.

(2) A scale or near scale layout of buildings or administrative sites SHALL be posted in at least one location at all Forest Service installations. Plan SHALL show fire safety features at a glance, such as, buildings, hydrants, extinguishers, fire ladders and other types of fire equipment, fuse boxes, means of escape, chain of command, and individual responsibilities. All personnel, including families living at stations, SHALL be familiar with the plan and SHALL participate in fire drills, at least once annually.



(3) Rodentproof containers SHALL be used for all but safety matches in forest buildings and vehicles.

(4) Fires SHALL NOT be started with flammable liquids.

(5) There SHALL be clear passageways to electric switches, extinguishers, hydrants, and exits.

(6) The officer in charge of a Forest Service installation SHALL see that the following utility systems





### 3.21(6)

are inspected by a qualified inspector and that the systems meet Forest Service, local, or nationally recognized codes. Inspection records SHALL be maintained:

Elevators	Bi-annually
Boilers, liquid pressure vessels	Annually
Air compressors (See index)	HSC 8.55
Electrical systems	Annually
Heating systems	Annually
Plumbing systems	Annually

### 3.22 FIRE FIGHTING EQUIPMENT

(1) Fire fighting equipment, such as Underwriter Laboratory approved extinguishers or sand and water containers, hydrants, and ladders as needed SHALL be provided for buildings. Sufficient fire ladders SHALL be provided to insure at least one for each building. Ladders should be available within 100 feet of the building for which it is intended. One ladder cannot effectively serve two buildings during an emergency. Escape ladders SHALL be permanently installed.

(2) In outlying stations where no special fire hazards exist, fire fighting equipment is not necessary for all buildings, if not occupied; but equipment SHALL be available.

(3) Shovels, dry sand in covered containers, or other suitable extinguishing agents SHALL be placed at accessible sites within or adjacent to repair shops, oil or gas dispensers, and other high-hazard areas. Sand SHALL be checked frequently to be sure it is dry. Minimum Fire Protection Requirements for Buildings: Building Handbook



# Fire Extinguisher Equipment

Type of Building	Fire Extinguishers	FSH 6443.44	
	CO <sub>2</sub> or Dry Powder	Sand hopper with Instantaneous trip approx. 6 cu. ft. of dry sand and 1 SH shovel	
	Small--Large		
Office	1		
Dwelling 3 room or smaller	1		
Dwelling 4 rm. or smaller	1		
Garages 1 and 2 car	1		
Warehouse w/shop	1	1	1 (Shop Sec.)
Warehouse w/o shop		1	
Forest Repair Shop	2	1	1
Oil House		1	

\*Small: CO<sub>2</sub> - 5 lbs. to 10 lbs; Dry Powder - 4 to 10 lbs.

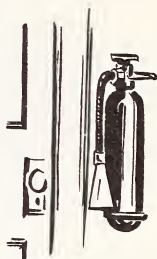
\*Large: CO<sub>2</sub> - 15 to 25 lbs.; Dry Powder - 15 to 30 lbs.

### 3.22(3)a.

3.22(3) a. All sand hoppers, buckets, and boxes constructed to house fire extinguishers SHALL be painted red with the words, "For Fire Only" appearing in white letters.

b. Forest Service hydrants, sill cocks, and other water supply outlets planned for fire protection purposes SHALL be painted red, and SHALL NOT be concealed or obstructed. FSH 5651.83

(4) Extinguishers SHALL be placed near doors for quick availability. Where fire could block access to them, they SHALL be mounted outside the building. Extinguishers SHALL be inspected and an attached card initialed and dated at least once a year.



(5) Water system for buildings SHALL include fire protection storage and hydrant as required by the Water Development and Sanitation Handbook.

### 3.23 STOVES AND FIREPLACES

(1) Stoves, pipes, and chimneys SHALL be kept in good repair, and inspected annually. Dangerous accumulations of 1/2 inch or more of soot and creosote SHALL be scraped or burned out.



(2) Stoves and stove pipes SHALL be installed at least 1 foot from combustible walls, provided there is a metal or asbestos shield 1 foot wider and higher than stoves, with a 1-inch open air space between shield and wall. If no shield is used, stoves and stove pipes SHALL be at least 2 feet away from combustible walls.



(3) A metal or other fireproof floor shield extending 6 inches beyond all sides of the stove SHALL be used on combustible floors. A minimum ventilated air space of 5 inches SHALL be provided between stove bottom and combustible floor.

(4) Bottomless stoves and those having fire boxes or ash pits supported directly on the floor SHALL have noncombustible bases.

(5) Pipe railings or metal screen guards 3 feet high and at least 18 inches from stoves SHALL be provided in shops and warehouses, except for space heaters with an outer jacket.

(6) A damper should be provided for wood stove pipes. Pipe SHALL be well braced and fastened by metal screws, stove bolts, rivets, or wire. Defective pipe SHALL be replaced

(7) Spark arresters or two elbows offsetting a straight pipe SHALL be required for each woodburning stove in tent camps.

(8) Oil and gas stoves must be installed in accordance with the Buildings Handbook.

HSC 3.36

### 3.23(9)

3.23 (9) The installation of spark arresters or temporary or permanent structures SHALL be optional with Regional Foresters and Directors.

(10) Vertical pipe outside of tents SHALL be at least 2 feet from the wall and should extend 3 feet above the ridge of the tent. Only metal guys SHALL be used.

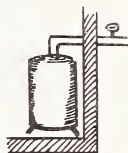


(11) Fireplaces SHALL be equipped with screens.

(12) Live ashes taken from stoves SHALL be removed from buildings at once and disposed of in a safe place.

(13) Woodboxes, beds, clothing, etc. SHALL be kept a safe distance from heating apparatus.

(14) Pipelines and connections used for conveying fuel to oil burning stoves or furnaces SHALL be kept tight. If tank is outside building, shutoff valve SHALL be provided at tank, for use in case of fire inside building.



### 3.24 CHIMNEYS

(1) New chimneys SHALL be supported on a firm base and SHALL include a well-constructed flue.

(2) All stovepipe should go directly into the chimney. Stovepipe extending through a wall or ceiling SHALL be provided with a double metal ventilated thimble not less than 8 inches larger in diameter than the pipe; the annular space SHALL be filled with mineral or rock wool.

### 3.25 FLAMMABLE MATERIAL

(1) Oily cleaning rags or mops SHALL be stored in a safe place.

(2) Metal cans with good covers SHALL be provided for oily shop rags. Cans SHALL be emptied frequently.

(3) All flammable debris in all buildings SHALL be disposed of promptly.

(4) Flammable materials such as dry grass, weeds, and brush SHALL be cleared for a safe distance, at least 25 feet if possible, around buildings, tent camps, and oil or gasoline dispensers.



(5) Roofs SHALL be kept free of flammable material, and hazardous branches. Branches near chimney or stovepipe outlets SHALL be cut.

### 3.26 IN CASE OF FIRE--

(1) Turn in an alarm at once, and check building for people. Conduct rescue and render first aid. HSC 3.15

(2) Remember the fire plan and do your job well.

(3) Disconnect electricity supplies and gas.

(4) Use the right type of extinguisher. HSC 3.28

(5) Use equipment correctly. Do not delay. If fire cannot be controlled get out of the building to a safe place.

### 3.26(6)

3.26 (6) If fire is controlled, make certain it is completely extinguished.

(7) Be sure that any equipment involved is made ready for re-use.

### 3.27 SEVEN STEPS TO SAFETY

(1) Know the nearest regular and emergency exits of any building you may be in, including your overnight lodgings.

(2) If you detect fire or smoke, act quickly but coolly. Notify the telephone operator or other source of help. Give exact information.

(3) Touch a door before you open it. IF IT IS HOT, KEEP IT CLOSED. Close transoms and cover cracks around the door.

(4) Take no unnecessary chances to get out of the room. Unless in immediate danger, you may be safer where you are.





(5) If the door is cool, open it a little. If the hall appears safe, leave by a known exit.

(6) If you must leave through heavy smoke, stay close to the floor. A wet cloth over your face may help breathing.

(7) Close doors and windows behind you to reduce drafts and slow down the spread of fire.

### 3.28 FIRE EXTINGUISHER FACTS

FIRE EXTINGUISHER FACTS

Type and Operation	Contents	Kinds of Fire and Use				Subject to freezing	Yearly maintenance	Comments
		A--	B--	C--	D--			
		Wood rubbish	Oil, grease flammables	Live elec. equip.	Motor vehicles			
(1)	Dry chem., stored-pressure w/gas cartridge	YES	YES	YES	YES	NO	Visual Insp. check openings, tags.	All types fine least mtce, time, most effective per pound, less expensive.
(2)	 Dry chemical bicarbonate of soda and drying agent--pressure cartridge--preferred type of extinguisher	NO but will control small fires.	YES	YES	YES	NO	Weigh gas cartridge, check nozzles and hose-tag.	Very effective extinguisher. Easy to use because it cools fire rapidly. Easy to maintain.
Use All-Class powder when refilling if possible.								
(3)	 Liquid CO2 under pressure --acceptable type of extinguisher	NO but will control small fires.	YES	YES	YES	NO	Weigh and tag.	Must be returned to distributor or factory for re-charging.
(4)	 Solution of aluminum sulfate and bicarbonate of soda.	YES	YES	NO Electric shock danger.	NO	YES	Empty, clean, re-charge, and tag yearly; protect from freezing.	Before emptying be sure hose and nozzle are not plugged. Then unscrew top and carefully re-move chemicals to prevent possibility of an explosion. Check hose and nozzle frequently throughout the year for plugging.
(5)	 Bicarbonate of soda and sulfuric acid.	YES	NO	NO Electric shock danger.	NO	YES	Empty, clean, re-charge, and tag yearly; protect from freezing.	







### 3.3 FLAMMABLES

#### 3.31 GENERAL

(1) NO SMOKING signs SHALL be posted on the inside and outside of all buildings and locations storing flammables.

(2) Smoking, open flames, or sparks SHALL NOT be permitted within 50 feet of where flammables with a flash point below 100° F. are stored or used.



(3) Containers used for any flammable SHALL be tagged to show contents and SHALL be closed tightly when not in use, whether full, partly full, or empty.

(4) When filling containers, a vapor space SHALL be left above the liquid level to permit expansion with rising temperatures.

(5) Motors SHALL be shut off before filling fuel tanks.

(6) Flammables with flash points below 100° F. SHALL not be stored or transported in glass containers larger than 1 pint.

(7) Dry cell batteries SHALL NOT be disposed of in a fire.

(8) Fireproof containers with lids SHALL be provided for oily rags or flammable rubbish. Contents SHALL be disposed of currently.

### 3.31(9)

3.31 (9) Nobody SHALL work in clothing soaked with flammables.

#### (10) Static electricity precautions--

a. Storage platforms for all flammables with flash point below 100° F. SHALL be grounded to prevent accumulation of static electricity.

b. All tank trucks SHALL have tank grounded to the truck frame and SHALL have a positive bond between truck and fill pipe.

c. Delivery hose or gas cans SHALL be grounded by holding the nozzle or spout against the container being filled.

d. Wool, nylon, or other static generating materials SHALL NOT be used to clean up spilled gasoline or flammables.



(11) Flammable liquids SHALL be kept away from radios or other non-vaporproof electrical equipment in unventilated places.

### 3.32 OIL HOUSES

(1) Drums of flammables SHALL be stored in separate oil houses or on shaded racks or loading docks 50 feet from other buildings.

(2) Oil-house floors SHALL be made of fire-resistant material.

(3) Doors SHALL open outward or be of the overhead lift-up or sliding-panel type.



(4) Proper ventilation SHALL be provided to prevent accumulation of vapors.

(5) Electric light globes SHALL be protected to avoid accidental breakage. All fixtures and switches SHALL be vapor- and spark-proof HSC 8.2 where explosion hazards exist.

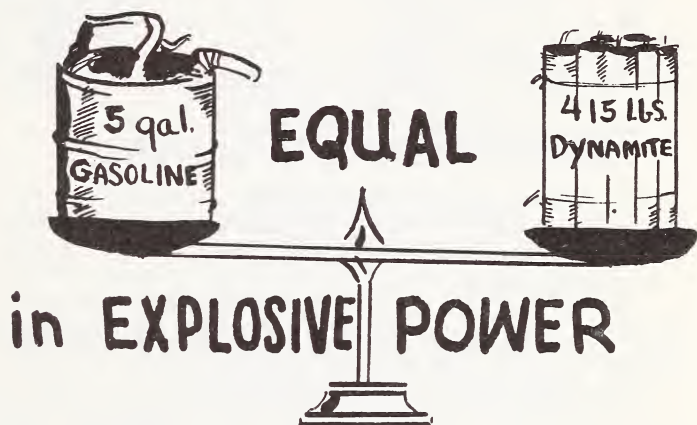
### 3.33 FLAMMABLE LIQUIDS OTHER THAN PAINT

Flammable liquids are those that give off flammable vapors at or below 200° F. They are dangerous when they are in open containers, when they leak or spill, or when they are heated. The degree of danger is determined by the flash point, whether the vapor-air mixture is in an explosive range, and the possibility of a source of ignition. The flash point is the lowest temperature at which a liquid gives off enough vapor to burn when lighted. A flash point of 100° F. is the point at which relative hazards change; below 100° F. flammable liquids become increasingly more hazardous as the flash point lowers.

#### Flash Points of Commonly Used Liquids in Degrees Fahrenheit

<u>Name</u>	<u>Flash Point</u>	<u>Name</u>	<u>Flash Point</u>
Acetone .....	0	Ethyl alcohol	
Acetyl Chloride..	40	(100%) .....	55
Allyl Alcohol ....	70	Ethyl Chloride ..	-58
Benzine.....	0 or less	Ethyl Ether.....	-49
Butane-n .....	-76	Fuel oil, burner .	100 to
Collodion .....	0 or less		200
Creosote Oil ....	165	Gasoline .....	-45
Denatured Alcohol	60	Hydrocyanic acid	0
Diacetone Alcohol	48	Kerosene.....	100 to
Diesel fuel .....	100		115

<u>Name</u>	<u>Flash Point</u>	<u>Name</u>	<u>Flash Point</u>
Linseed Oil .....	403	Rubber Cement...	50 or less
Machine Oil .....	300	Stoddard Solvent..	100 or higher
Methyl Alcohol .....	52	Varnish .....	80 or less
Methyl Acetate .....	14	Varnish Shellac ..	40-70
Motor Oil .....	315	Xylene-o .....	63
Naptha V.M.&P. ...	20		
Penetrating Oil .....	100		



(1) At permanent stations, underground storage tanks SHALL be provided for 100 gallons or more of gasoline. Underground storage tanks SHALL be vented by a pipe of not less than 1 1/4 inches inside diameter.

a. The lower end SHALL NOT extend more than 1 inch into the top of the tank.

b. The upper end SHALL have a weather-proof fitting.

FIRE

FLAMMABLES

c. The vent SHALL terminate outside, not closer than 2 feet from any building opening.

d. It SHALL extend 8 feet above the top of the fill pipe.

(2) Small amounts of gasoline SHALL be stored in closed drums or safety cans in separate buildings or outside, but not in the sun.

(3) All gasoline or other flammable fluids with flash points under 100° F. SHALL be handled by Underwriter Laboratory approved pumps or in Underwriter Laboratory approved safety cans, labeled as to contents.

(4) Gasoline and other flammable fluids SHALL NOT be stored on equipment, except for 1 day's supply in fuel tanks or safety cans.

(5) Gasoline may be kept in warehouses with assembled fire suppression units, if no more than one 10-gallon can SHALL be assigned to each unit, provided such storage conforms with local laws. When the fire season is over, gasoline cans SHALL be removed from the units and stored in the oil house.

(6) Gasoline and kerosene lamps SHALL be filled in daylight hours out of doors.

(7) Workers SHALL be instructed in care and use of gas lanterns.

(8) Spilled gasoline, kerosene, or oil SHALL be wiped up at once. Gasoline spilled on any part of body SHALL be washed off immediately.



### 3.33(9)

3.33 (9) Substantial closed metal cans SHALL be used for handling and storing flammables.

a. Underwriter Laboratory approved safety cans SHALL be used indoors.

b. Army jeep or blitz cans may be used on rough field work.

c. For permanent use, gasoline cans SHALL be red and labeled.

d. Temporary cans SHALL be identified with a red tag marked "gasoline."

e. Kerosene can be stored in dwellings in 2-gallon closed cans but they SHALL be kept away from flames and sparks, at temperatures well below 100° F.

f. A safety can that leaks when upright or more than 4 drops per minute when inverted SHALL NOT be used until repaired



### 3.34 FLAMMABLE PAINTS

(1) Paint should be stored in an oil house or in other special building.

(2) Storage of unopened paint containers SHALL be permitted in a safe, well-ventilated storage space not exposed to excessive heat, when oil house or other isolated structure not available, if adequate fire protection is provided.

(3) Open containers of paint or lacquer thinners exceeding 5 gallons SHALL be stored in oil house. Up to 5 gallons, in current use, should be kept in a metal locker in a repair shop, office, or warehouse. Cans SHALL be tightly covered.



(4) Neither smoking nor open flame SHALL be permitted in rooms where spray guns are in operation.

(5) When painting indoors, adequate ventilation SHALL be provided.

(6) Paint rags SHALL be disposed of daily.

(7) Pressurized paint containers SHALL be kept in the shade. They SHALL NOT be disposed of by burning.



### 3.35 FUSEES

(1) They SHALL be kept clean, dry, and away from steam, water, oil, or excessive heat.

(2) 500 fusees or less can be stored in a rodent-proof container in a warehouse or fire cache.

(3) More than 500 fusees should be stored in their original containers in structures built for flammables.

(4) Defective fusees SHALL be destroyed by burning, but not in a stove.

### 3.36 BOTTLED GAS

This gas, like gasoline vapor, is heavier than air. It will flow long distances and settle in low places in explosive mixtures.

(1) All ordinances, Underwriters' Laboratory standards and Petroleum Engineers' recommendations on bottled gas storage, installation, and use SHALL be observed.



FIRE

FLAMMABLES

### 3.36(2)

3.36 (2) Each installation utilizing bottled gas SHALL be inspected and approved by the local authority having jurisdiction.

a. Upright containers of 125 gallons (water capacity) should be located a minimum of five feet from the building, and placed on a concrete base with adequate support to hold the tank.

b. The following minimum distances from house or property line to tank relief valve will be observed for the following L.P.G. containers:

125 to 500 Gallons (water capacity) 10 feet

500 to 1200 Gallons (water capacity) 25 feet

Over 1200 Gallons (water capacity) 50 feet

(3) Tanks containing butane and other liquified gases SHALL be transported, used, and stored with the safety valve protected, and always with good ventilation.

(4) Tanks in snow or sleet country SHALL be protected to prevent breaking of connections. Tanks SHALL be placed on firm foundations, with supports and non-metallic straps for holding tanks upright and pipes in position. In areas where below-freezing temperatures occur, only bottled gas that will not freeze SHALL be used.



(5) Tanks SHALL NOT be dropped.

(6) Tanks SHALL NOT be repainted except with the permission of the owner, and then only with paint with a heat reflecting surface equal to aluminum or white.

(7) No container other than that furnished by a distributor SHALL be used for bottle gas.

FIRE

FLAMMABLES

(8) Gas regulators SHALL be checked only by authorized persons.

a. The cylinder valve should always be tightly closed when the cylinder is not in use or when it is empty (see Storage of Cylinders). HSC 8.34

b. Liquid Petroleum Gas must not be allowed to come in contact with the flesh as it may result in blisters due to its rapid evaporation.

(9) No cylinder in use SHALL be located within a building enclosed on 4 sides, nor within 5 feet of a source of ignition, nor below ground level, nor with the outlet less than 5 feet away from any building opening that is below the level of such outlet.



(10) Regulating or filling equipment on tanks or cylinders SHALL NOT be less than 15 feet from any opening into or under a building if such opening is below the level of the outlet of the regulating or filling equipment.

#### (11) Stoves

a. Stoves SHALL be installed and maintained in accordance with local ordinances and Underwriters' Laboratory standards.

b. Operating instructions SHALL be permanently posted.

c. Extra care SHALL be used when lighting stoves; gas is heavier than air and does not escape up the vent.

d. Match SHALL be lighted first; then the valve SHALL be opened.

e. A separate manual shut-off valve SHALL be provided between the shut-off valve and the stove to permit removal of the controls, the stove, floor furnace, water heater, etc.

3.36(12)

3.36(12) When tracing gas leaks, employees SHALL--

- a. Forbid smoking or any open flame or spark.
- b. Close gas cock.
- c. Open windows and doors.
- d. Apply soapy water with brush to connections and watch for bubbles revealing leak.
- e. Call gas company or fire department if leak is serious.



(13) a. Only white or appliance gasoline recommended by manufacturer SHALL be used in gasoline lanterns or stoves. It SHALL always be kept in safety can except quantities of one gallon or less may be kept in metal can.

b. A gasoline lantern SHALL be lit outside a building or tent and be brought inside only after it is burning properly.

c. Gasoline lanterns and stoves SHALL NOT be lit when there is an accumulation or spillage of gas. Wipe up excess and dispose of rag before attempting to light.

d. Personnel who use gasoline lanterns and stoves SHALL receive training in care and operation before they are authorized to use them.

### 3.37 PROPANE TANKS AND TORCHES HSC 8.34

(9) They SHALL be stored in a cool dry place, top end up, and safely away from fire, with smoking prohibited.

(2) They SHALL be transported with top end up, fastened down, fixtures tight, and handled carefully.

(3) In filling propane torches--

a. Supply tank SHALL be placed higher than receiving tank.

FIRE

FLAMMABLES

b. 10-percent filler safety valve SHALL be attached in place in torch tanks.

c. Supply tank SHALL be warmer than receiving tank, accomplished by--

1. Placing supply tank in warm room for 1 hour or more prior to transfer.

2. Placing supply tank in sun and receiving tank in shade.

3. Submerging receiving tank in water colder than the air.

4. Wrapping hot blankets around the supply tank.

5. Pouring hot water over the wrapped or unwrapped supply tank.

d. Propane SHALL be kept away from person or clothing.

(4) Propane tanks, empty or filled, SHALL be protected from hot sun and fire at all times.

### 3.38 NITROCELLULOSE FILM

(1) All employees who use the film SHALL be informed of its explosive and toxic characteristics.

(2) Storage and use SHALL conform with National Board of Fire Underwriters and local fire codes.

a. All wiring and equipment SHALL conform to the National Electrical Code.

b. Only incandescent electric lights SHALL be permitted; they SHALL be protected with substantial wire guards, vaporproof globes, or both.

c. Portable lights on extension cords SHALL not be used in any storage room or vault.

d. Illuminators SHALL be built so that the diffusing glass does not become overheated.

(3) Storage of not more than 1000 pounds of film in cabinets in one location SHALL be allowed, provided

that the location is equipped with automatic water sprinklers and vented to the exterior of building.

a. Cabinet SHALL NOT contain more than 250 pounds.

b. Storage of less than 100 pounds need not have sprinklers, providing cabinet is so constructed and insulated that each roll of film is in an individual compartment where it could burn without igniting adjacent film.

c. Fire extinguishers of types using water or water solutions SHALL be provided for the protection of all rooms containing film where sprinklers are not installed

(4) Storage of over 1000 pounds of film SHALL be in fireproof vaults.

a. Vaults should be located on roof or top floor so that they can be vented to the outside.

b. Vents SHALL be in the ratio of 1 square inch of vent area per 5 pounds of film storage.

c. Vents SHALL be located at least 50 feet from nearest wall opening.

(5) No film SHALL be stored within 2 feet of steam pipes, radiators, or other sources of heat.

(6) Smoking SHALL be prohibited in rooms where film is handled or stored; "NO SMOKING" signs SHALL be conspicuously posted in prominent places.

(7) Proper warning SHALL be marked on the file or the container.

(8) Discarded film SHALL be stored and handled in the same manner as other film until removed from the premises.

(9) All 16 mm. film is safe, and all aerial film delivered subsequent to 1940 is acetate base safety film.



## 3.4 LIGHTNING

### 3.41 GENERAL

(1) Every precaution SHALL be taken to prevent injury and loss from lightning.

(2) All lightning-protection installations SHALL be checked at beginning of season and also after direct strikes.

(3) Switch handles SHALL have rope throws to reduce chance of shock.

(4) See Lightning Protection Handbook for methods of grounding and installation of radio antennae, and Form 901 for instructions for use of phone during storm. The same methods SHALL be used for any structure in an exposed location. Warning sign should call attention to the danger of being near the lightning grounding net at the tower base.

FSH2 5651.63b

### 3.42 DURING LIGHTNING STORMS WHEN IN THE FIELD

(1) Employees SHALL discontinue working in the open and SHALL--

a. Get within a metal shield, such as the cab of a rubber tired vehicle.

b. Seek shelter in dense woods, a grove of trees, if possible a stand of young growth, a cave, a depression in the ground, a deep valley or canyon, or at the foot of a steep cliff.



FIRE

LIGHTNING



3.42(1)c.

3.42(1) c. Choose shelter in this order.

1. Large metal or metal-frame buildings.

2. Buildings with lightning protection.

3. Large unprotected buildings.

4. Small unprotected buildings.

d. Get under a steel bridge, but never touch the steel; and never sit or stand on damp ground.

e. Sit or lie down if in open country. Avoid grouping together.

f. AVOID LARGE OR LONE TREES.

g. GET AWAY FROM HORSES AND STOCK.

h. AVOID TOPS OF RIDGES, HILLTOPS, WIDE OPEN SPACES, LEDGES, AND OUTCROPS OF ROCKS, AND SHEDS OR SHELTERS IN EXPOSED LOCATIONS.

i. Keep away from wire fences, telephone lines, and metal tools. If absolutely necessary to work on telephone line with a lightning storm in the distance, the line SHALL be grounded in the direction of the storm before repairs are attempted. Stay away from rivers and lakes.



### 3.43 DURING LIGHTNING STORMS WHILE IN LOOKOUT OR OTHER BUILDINGS

(1) Employees SHALL--

a. Stay inside building and away from all metal objects and the walls.

FIRE

LIGHTNING



b. Never use the phone or radio while storm is overhead. Disconnect the incoming telephone line from the lookout; ground the instrument by pulling the rope attached to the switch handle of the combination arrester-disconnect switch.

c. Close and keep away from windows, doors, and fireplaces. Lightning follows air currents.





# CHAPTER

# 4

## Public Safety



General



Recreation



Off the Job



Civil Defense



## CHAPTER 4. PUBLIC SAFETY

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## 4.1 GENERAL PUBLIC SAFETY

### 4.11 SEARCH AND RESCUE

(1) Primary responsibility for emergency assistance within national-forest boundaries is placed on sheriffs in some States and on highway patrols in others. In Alaska, U. S. Commissioners and Postmasters are responsible. The Air Rescue Service of the United States Air Force is responsible for crashed aircraft and rescue of victims within the boundaries of the United States; in Alaska, the United States Coast Guard is responsible. The Forest Service SHALL assist these primary agencies as follows:



a. Persons who are lost, seriously ill, or injured, or who die within the exterior boundaries of the national forests SHALL be searched for and transported to the nearest place where there are interested parties or local authorities, if the situation can be met only through action by the Forest Service. When practicable, immediate steps SHALL be taken to get clearance with the primary agency in each case. Deceased persons SHALL NOT be moved without the approval of appropriate authorities.

b. If search starts within the exterior boundary of a national forest, it can extend to areas immediately outside, if the emergency warrants it.

c. For minor accidents, if there is no immediate danger to life or health, incidental help, information, or advice SHALL be given.

d. For major accidents such as drowning, serious injuries, or lost persons, every assistance SHALL be given until the legally designated agency can take over.

4.11(1)e.

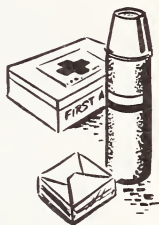
4.11 (1) e. In air rescue work we SHALL render immediate aid where lives may be saved when the primary agency cannot arrive in time to do so, and also we SHALL--

1. Assist the primary agency in arrangements for transportation to the crash area, including taking ground crew to the scene.

2. Provide observer assistance where air search is necessary.

3. Furnish maps, details as to forest organization, and best routes of travel to crash area.

f. Crews searching for lost persons SHALL carry first aid kits, also hot drink or food and blankets when practicable.



FSH 6163.82

#### 4.12 TRAVELING PUBLIC

FSH 1591.31

(1) Regular traffic rules SHALL be applied wherever possible

(2) Where departure from regular traffic rules is necessary, such as on some logging projects, the following steps under Special Service Regulations SHALL be taken: FSH 2736

a. Public use of the Forest Service road SHALL be permitted only on certain hours or days. Traffic SHALL be rerouted where possible when regular traffic rules are not in effect.

b. If traffic cannot be re-routed, signs SHALL be conspicuously posted at each end of the road, worded about as follows: DANGER--LOGGING TRUCKS HAVE RIGHT-OF-WAY.



c. When special driving rules are in effect, all approaches and frequent strategic places along the route SHALL be posted with reminder signs. Return to regular traffic rules SHALL be posted also.

d. Signs SHALL be immediately removed as soon as special driving rules are no longer needed.

#### 4.13 AVIATION

(1) Permits to power companies SHALL require safe line locations to minimize high line hazards, marking towers at ends of long spans, avoiding if possible putting lines across lakes or canyons, and conspicuously marking static or other lines endangering aircraft.







## 4.2 RECREATION

### 4.21 RECREATION AREAS

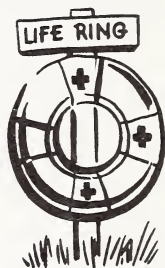
(1) All facilities SHALL be kept in safe operating condition and all hazards SHALL be eliminated.

(2) Developed swimming areas SHALL have depth markers and signs stating water depth will be placed on all diving boards and floats.

a. Lifesaving equipment should be provided at all developed swimming areas.

b. Diving facilities SHALL meet American Red Cross recommendations.

c. Beach and swimming areas SHALL be cleared of hazardous logs, snags, stumps and sharp rocks. Debris such as cans, bottles, and floating trash SHALL be cleared from the beach and swimming area.



(3) Reasonable competence in skiing should be required of personnel administering winter sports areas.

(4) A safety plan which clearly fixes responsibility for safety measures including avalanche hazard warning and control FSH 2356.25e SHALL be prepared for each developed winter sports area on national forest land.

(5) Trees on camp and/or picnic areas SHALL be inspected prior to the opening of the season, and after each high wind or

HSC 9.3

#### 4.21(5)

storm period; and all broken, hanging or weakened trees, limbs or tops, and dead trees SHALL be removed immediately.

#### 4.22 SPECIAL USES

HSC 1.11(9)

(1) Special use resorts SHALL be inspected critically and periodically to insure permittee compliance with safety and sanitation requirements.

FSH 2713.51  
2719.6  
2719.61  
2719.62

(2) State sanitary and fire laws SHALL be observed in every detail at all developed areas.

(3) Ski lifts SHALL be inspected critically and periodically to insure permittee compliance with safety requirements. This includes the mechanical condition of the structure, the way it is being operated, and the manner in which its users are being controlled in safe, orderly conduct.



FSH 2332.31

(4) An adequate ski patrol, either paid or voluntary, SHALL be on duty on ski areas when lifts or tows are being operated.

#### 4.23 AVALANCHE CONTROL

(1) A detailed action program to insure skier safety from avalanches SHALL be a part of every winter sports area's safety plan. It SHALL provide for area closure if avalanche threatens without means of release. All winter sports

FSH 2332.81

PUBLIC SAFETY

RECREATION

areas that may experience threat of avalanche SHALL be supervised by a forest officer especially qualified by training and experience to recognize and handle avalanche threat.

(2) No blasting or releasing of avalanches by other means SHALL be attempted by any person not specifically authorized by the forest supervisor to perform such extraordinarily hazardous work.

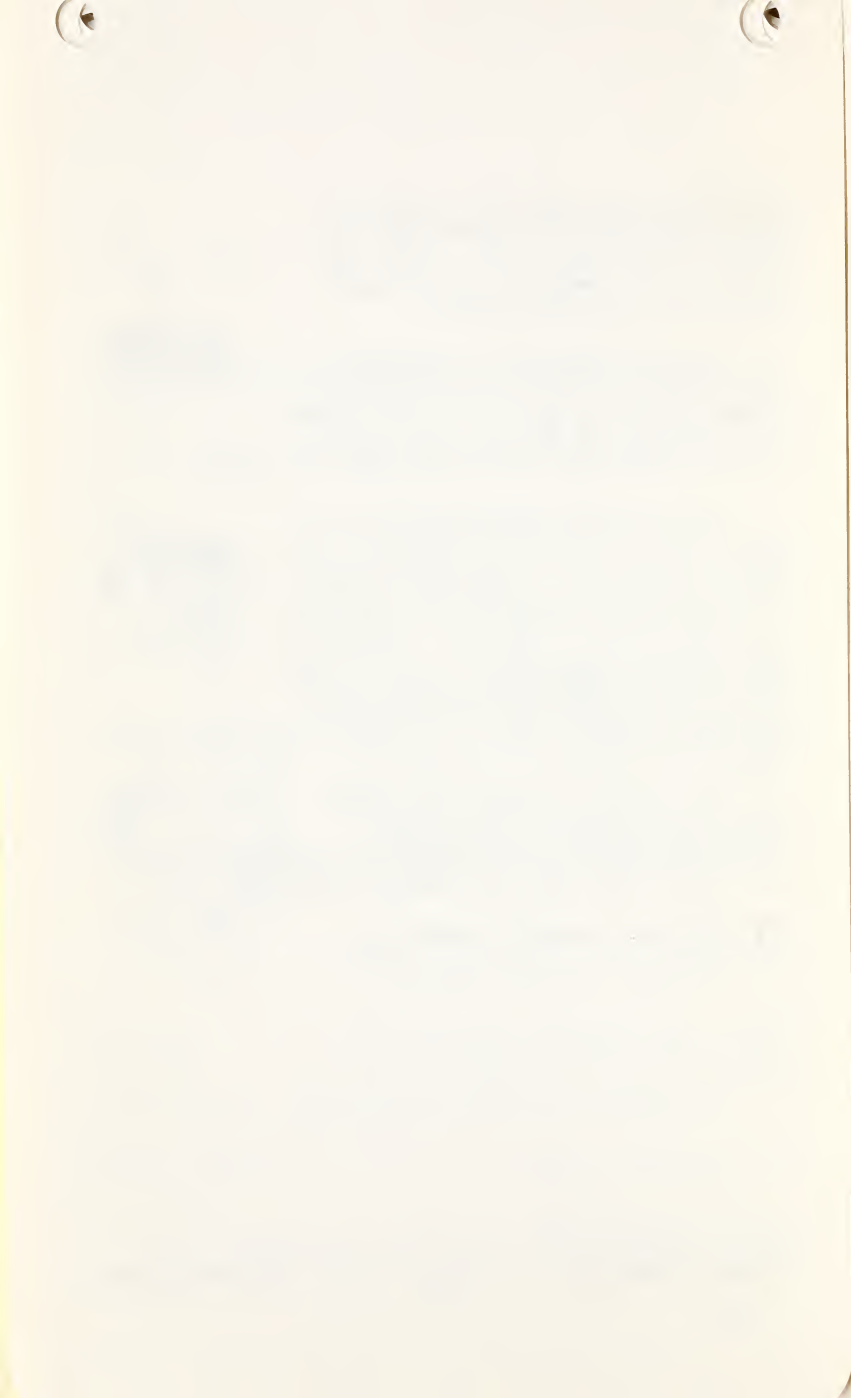


(3) Personnel assigned to winter sports area administration SHALL have demonstrated their competence in skiing and SHALL have received specific training in winter first aid, avalanche and rescue work, and other specialized activities as appropriate to the locality. To the greatest extent possible, such personnel should be able to qualify as members of the National Ski Patrol.



(4) Leaders of avalanche blasting parties SHALL be especially trained not only in the handling of explosives in general but also for this particular purpose.

(5) See Avalanche Handbook.





## 4.3 OFF THE JOB

### 4.31 GENERAL

(1) The Forest Service is concerned about your safety at home as well as on the job. To help you protect yourself and your family from injury we urge you to use the home safety code.

### 4.32 RECOMMENDED HOME SAFETY CODE

(1) Helpful hints for a foolproof home safety campaign:

- a. Hazard hunts--Conduct regularly.
- b. Analyze hazards.
- c. Prepare plan of action.
- d. Put plan to work--Entire family partici-

pate.

e. You appoint selected member to check on correction of hazard.

(2) Parents should set a good example by maintaining a safety-minded attitude.

(3) All members of the household, especially children, should be instructed in what to do in an emergency.

- a. Post telephone numbers of doctor, fire department and police.
- b. Instruct in how to report an emergency.
- c. Plan fire escape routes and practice.



EMERGENCY PHONE NOS	
FIRE	-0000
POLICE	-0000
RESCUE	-0000
DOCTOR	-0000



#### 4.31(3)d.

4.31(3) d. Adults practice first aid, especially artificial respiration. Use the First Aid Guide

First Aid Guide

4.32 (4) Chemical hazards shall be handled as follows:

a. Read and follow manufacturers' instructions on all containers.

b. Medicines - keep properly labeled in a special cabinet away from food and out of reach of small children. Never take medicine in the dark. Always read the label. Dispose of stale or unused portions of prescriptions.

c. Poisons, Fumigants, Acids, Insecticides and Caustics-- Keep in tight, labeled containers, away from food and out of reach of children.

CONSIDER ALL BLEACHES AND DETERGENTS AS DANGEROUS.

d. Acids and Caustics. - Handle carefully. Use rubber gloves, rubber aprons, and rubber-framed goggles. Wash hands before handling foods. Always pour acids into water, never water into acids. Avoid fumes.

e. Paints, Varnishes, etc. - Avoid fumes, use in well-ventilated rooms. Be sure the paint on children's toys and furniture does not contain poison. Wash hands before eating.

f. Refrigerators - Buy Underwriters' Laboratory approved refrigerators only; have competent serviceman install and repair; if leak occurs, ventilate room and shut off machine.



HSC 8.37



g. Polishing and Cleansing Materials. - Keep in tight labeled containers away from food and children. After using, wash hands before eating.

(5) Fire hazards SHALL be eliminated. To do this -

- a. Keep matches away from children.
- b. Do not allow combustible waste to accumulate.
- c. Keep stoves and chimneys clean, tight, and insulated.
- d. Keep oily rags in tight metal can.
- e. Fill oil or gasoline lamps and stoves while unlighted outdoors.
- f. Never use flammable cleaning solvents.
- g. Keep curtains away from open flames.
- h. Do not use candles on Christmas trees.
- i. Keep celluloid and other flammables away from heat.
- j. Burn trash only in a safe place.
- k. Use a screen for open fireplaces.



- (6) Electrical hazards SHALL be avoided:
- a. A qualified electrician SHALL install and inspect wiring.
  - b. All electric appliances SHALL be turned off when not in use.
  - c. Circuits SHALL NOT be overloaded.
  - d. Extension cords and wiring SHALL be repaired if insulation is defective.
  - e. Base plugs SHALL be made inaccessible to small children wherever possible.
  - f. Bathroom switches and pull chains SHALL be made of non-conductive material.
  - g. Appliances such as washing machines SHALL NOT be operated where



#### 4. 32(6)g.

a person could become the ground of a short circuit, such as standing on a wet floor and touching the machine.

##### (7) Gas hazards:

- a. A qualified plumber SHALL install and service all gas plumbing and appliances.
- b. Leaks should be located by painting suspected joints with soapy water. Do not use an open flame.
- c. If you detect a leak, ventilate the room and turn off the gas.
- d. Bottled gas SHALL be stored outdoors in a well-ventilated place - never in a basement.
- e. Stoves and heaters SHALL be provided with exhaust vents.

(8) Preventing falls--Repair defective ladders; varnish, never paint ladders; don't use makeshift supports. Keep stairs repaired, clear, well lighted; install handrails. Remove ice and snow from sidewalks and stairs; use nonskid wax inside. Use rubber mat in bathtub and shower.

(9) Miscellaneous hazards SHALL be handled this way:

- a. Dispose of plastic bags, broken glass, tin cans, nails, tacks, and razor blades in a safe manner.
- b. Keep furniture and other objects out of customary travel paths.
- c. Stack heavy articles in a safe manner and place.
- d. Wipe up spilled liquids and semi-liquids.
- e. Never place a pillow in infant's bed.
- f. Never carry an infant and a vessel of hot liquid at the same time.



g. Keep handle of cooking vessels turned away from edge of stove.

h. Protect children from electric shock by covering outlets and using thick unsulated cords.

i. Keep wild pets away from infants.

j. Keep extra electric fuses and flashlight handy.

k. Keep first aid kit and First Aid Guide handy.

l. Toys and Playthings: First Aid Guide

Lead paints SHALL NOT be used.

Avoid small articles or parts that can be broken off and swallowed by children. Paints and crayons should be kept from children's mouths. Never handle electric toys with wet hands. Special caution is urged in handling model internal-combustion engines, construction toys, chemical sets, and toy weapons. Fly kites in dry weather, and use cotton string, away from power lines.

m. KEEP CHILDREN OUT OF ADMINISTRATIVE SITES AND AWAY FROM PLACES WHERE CREWS AND MACHINES ARE WORKING.

n. Watch out for children in driveways.

#### 4.33 YARDS, GARDENS, HOBBIES, AND TRIPS

##### (1) Hand Tools:

a. Use the right tool for the right job. Use tool properly. Keep tools in safe condition and store in a safe place.

b. Use pry-type can opener with care.

c. Wash sharp knives separately. Do not use to open cans. Keep in racks away from children.

d. Handle scissors carefully. Never let children use sharp-pointed scissors. Store in safe place away from children.

#### 4.33(2)

#### 4.33 (2) Outside work:

##### a. Driveways and Walks. -

Avoid deep and steep driveways. Keep steps in good repair, well lighted, and free of children's toys or other objects.

##### b. Games and Sports. -

Keep equipment in safe condition; play games according to rules; keep children off roads and streets.

##### c. Garages. -

Never warm up engine in a closed garage. See that wheels are blocked before getting under a car. Use blocks under car when using jack.

##### d. Lawn and Garden Tools. -

Do not leave tools lying about. Never leave sharp edges turned up. Store tools in a rack off the floor. Rotary-type mowers are particularly dangerous and the following safe practices shall be observed:

1. Mower SHALL be maintained in good mechanical condition with complete protective shields to reduce throwing of debris by the blade. Blade should be inspected periodically to make sure it has not been damaged to the extent of being unsafe.

2. All litter such as stones, boards, limbs, wire, glass, pine cones and large fruits and nuts SHALL be removed from the area to be mowed prior to starting the mower.

3. Care SHALL be taken in starting the motor to keep feet outside of the protective skirts. Place one foot on the mower as a brace and pull the starting cord without jerking.



HSC 7.18



4. Persons other than the operator SHALL NOT be permitted to stand near the mower (minimum of 50 feet) during mowing.

5. Care should be used to avoid running the blade into irregular surfaces of the lawn and into fixed obstructions such as curbs, walks, posts and pipes.



6. Mower should not be adjusted or repaired while running. It SHALL be cooled for 5 minutes before filling with gasoline, and moved at least 10 feet before starting again.

7. Gasoline SHALL be kept in a regular safety can painted red and labeled in white letters indicating contents.

8. Allow the motor to cool before returning machine to storage area.

e. Cesspools, Cisterns, and Wells. - Keep covered with strong cover. Let experts do the cleaning. When abandoned fill in to ground level.

f. Clothes lines. - Do not leave low lines in place overnight.

g. Snow and Icicles. - Remove overhanging snow and icicles from above doors, windows, and walks. Use salt or sand on steps and walks. If you are over 45 years of age, take it easy when shoveling snow.

### (3) Hobbies:

a. Firearms. - Store locked up and unloaded, breech open, away from children. Treat all guns as if loaded. HSC 5.1  
HSC 7.18

b. Home workshops - Do not permit children to operate power tools alone. HSC 7.18

## 4.34 DRIVING AND VACATIONS HSC 2.11

a. Family members SHALL be trained to drive defensively at all times.

4.34      b. Family members      HSC 2.5  
should know how to swim and to ad- First Aid Guide  
minister artificial respiration.

            c. Family members should be trained in  
correct use of firearms.



#### 4.4 CIVIL DEFENSE

(1) It SHALL be the responsibility of the Division of Personnel Management to handle the distribution of Civil Defense informational material and Code supplements pertaining to health and welfare to all Forest Service employees.

(2) The extent to which one prepares for himself, his home and family, provides fallout shelter, stocks survival items, and makes other preparations must be left to each individual's judgment. Individuals should base their decisions on current recommendations outlined by the Office of Civil Defense.

(3) For detailed information, see "Information for Emergencies" survival packet distributed to all employees, and FSH 1700, Defense Activities.

FSH 1700



# CHAPTER

# 5

## Project Work



Firearms



Forest Project Work



Sales and Scaling



Roads and Trails



Cruising and Surveying



Fencing



Wood Preserving



Radioactive



## CHAPTER 5. PROJECT WORK

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## 5.1 FIREARMS

### 5.11 GENERAL

(1) Firearms SHALL be permitted on the job or in camp only after obtaining permission from a responsible supervisory forest officer.

(2) All Federal, State, and local laws SHALL be observed.

(3) Firearms and ammunition SHALL be kept in a safe place when not in use, preferably locked up.

(4) Firearms SHALL always be treated as if they were loaded.

(5) There Shall be no horseplay while handling firearms.

### 5.12 PROJECT WORK

(1) During hunting season--

a. Signs SHALL be posted to warn hunters of crew locations.

b. All employees working in hunting or other dangerous areas SHALL wear colored markers that provide maximum protection for local conditions. Bright orange, red, or yellow SHOULD be selected for hard hats and vests used as protective devices in these areas.

c. Crews SHALL be placed outside of hunter concentration areas if possible.



YELLOW, RED  
or ORANGE



## 5.12(1)d.

5.12 (1) d. Crews SHALL assign a lookout to warn hunters where practicable.

(2) In brown or grizzly bear country in Alaska--

a. Each crew SHALL have at least one man who is familiar with local conditions and is a good shot. He SHALL carry a dependable rifle firing the 30/06 or larger cartridge with sufficient soft-nosed ammunition of at least 180 grain weight.

b. The rifleman SHALL sight-in the rifle at the beginning of the season before going into the woods and be responsible for maintaining it in good condition.

c. No one should be allowed to go on long trips into the woods unarmed or alone.

d. No one SHALL be allowed to shoot at wildlife unnecessarily, especially bear.

e. Each member of the crew SHALL have fired the rifle and be capable of using it in an emergency.



## 5.13 USE OF FIREARMS

(1) Loaded firearms SHALL NOT be permitted in buildings, vehicles, boats, camps, on horseback, or when not in use. The safest firearm has an open action.

(2) When weapons are handled in the company of other persons and groups and in non-emergency situations, the firing chamber SHALL be empty.



(3) While awaiting turns at target practice, the firing chambers SHALL be empty and the action open. Weapon SHALL be loaded only just before firing.

(4) There SHALL be no target practice where there is danger from ricocheting bullets.

(5) Safety devices SHALL be kept in perfect working order.

(6) Ammunition recommended by manufacturer SHALL be used. A competent gunsmith SHALL be consulted on proper ammunition to use in foreign guns.

(7) A man carrying a loaded firearm SHALL NOT climb a tree or fence. Before going through a fence, he SHALL put the gun through and lay it on the ground, pointing away from him.

(8) When stalking game or in other situations when gun must be loaded, men SHALL use safety catch at all times and point the weapon at the ground in front.

(9) Firearm SHALL be pointed only at those things you intend to shoot.

(10) Be sure no one is in your line of fire.

(11) Do not shoot at any sound or movement in the brush.

(12) Before loading firing chamber, make sure that there are no obstructions in the gun barrel.







## 5.2 FOREST PROJECT WORK

### 5.21 GENERAL

(1) Each project SHALL be planned and accident hazards listed prior to beginning work. Each employee SHALL be given instruction about the project hazards, job skills, tools he will use, and woodsmanship.



(2) Safe work clothing and protective devices SHALL be worn as conditions warrant and as required by the work supervisor. See Safety Equipment. HSC 7.3

(3) Safe operating plans SHALL be provided for mechanized equipment before assignment to a crew.

(4) The area to be occupied by the swing of hand tools (axes, mattocks, hammers, etc.) SHALL be clear of all obstructions that could possibly deflect the tool during the swing. This applies also to the area occupied by the body and arms of the person swinging the tools. Footing must be secure.

### 5.22 TREE FELLING

(1) The job SHALL be planned in advance:  
a. Before felling, an experience man SHALL check for--

1. Species.
2. Size.
3. Soundness.
4. Dead Limbs.
5. Burning top and bark.
6. Top-heaviness.
7. Direction of lean.

5.22 (1)a. 8. Nearby hazards--trees, people.

9. Slope of ground.

10. Direction and wind velocity.

11. Position of standing or down timber that might deflect tree.

b. Tree fellers SHALL select a clear escape route before starting the cut. Practice drills are recommended.

1. If possible, stand behind another tree, preferably quartering back from the the planned direction of fall; watch for the whiplashed branches and other broken tree parts. The shielding tree should be of sufficient size to give protection.

2. Be sure to get clear of the butt.

3. Look up and watch for falling branches; continue to watch until all broken branches have fallen, especially those that may be thrown back by an adjacent tree or snag brushed by the falling tree.

4. The quadrant opposite the planned fall of the tree may be the most dangerous. An escape route at right angles to the planned direction of fall preferably on the contour, should be chosen unless there are some peculiarities of the individual situation.

c. Fellers SHALL be so placed that there is no danger to nearby workers; preferably all SHALL work on the same contour, rather than some working above others on steep hillsides.

d. One man SHALL be stationed to watch and warn for falling limbs or tops in dangerous situations.





e. Flagman SHALL be stationed when felling is planned across or alongside any traveled route, unless road or trail can be effectively blocked and signed.

(2) Before felling any tree or snag, enough space SHALL be cleared around the base and overhead to make plenty of working room and to provide for escape in emergencies. Firm footing SHALL be provided.

(3) For a heavily leaning tree, a deep undercut with side cuts SHALL be made. Next cut corners of backcut, then cut squarely across to prevent splitting or barberchair.



(4) Wood holding in partially rotted trees SHALL NOT be trusted.

(5) Once started, the felling SHALL be finished before the crew leaves the job for lunch or at the end of the day.

(6) If a push pole is used, it SHALL be held against your shoulder.

(7) Just before tree starts to fall, "TIMBER" SHALL be shouted twice or a noise device used by hand or power felling crew, so those nearby will have time to get in the clear.



(8) Employees SHALL watch out for other trees which may fall in an undetermined direction when hit by a falling tree.

(9) A lodged tree SHALL never be climbed. It SHALL be handspiked or pulled down by a horse, tractor, or truck and a chain, or by felling another tree upon it, rather than by cutting the tree in which it is lodged.

5.22(10) When topping or limbing, be careful if tree is held off the ground by one of its branches.

(11) Cutters should stand on side of tree opposite the branches they are cutting, where practicable.

(12) A sapling or branch that is bound down SHALL be cut from beneath with an ax, brush hook or similar tool.

(13) When trees on sloping ground are bucked, blocking or other devices SHALL be used to prevent rolling or sliding. If only one man is sawing, he SHALL work from the uphill side.

(14) Choker setters or similar workers should check for snakes before placing choker around log or working with felled timber in snake country.



## 5.23 BLISTER RUST CONTROL

HSC 2.31  
2.34

(1) Workers SHALL wear--

a. Logger-type shoes with non-skid soles, such as boot calks, hobnail, or composition soles, depending on local requirements.

b. Puncture-, tear-, and snag-resistant trousers without cuffs.

c. Tear-resistant shirts, especially brush areas.

d. Hard hats when in dangerous areas, otherwise brimmed hat or billed cap.

e. Leather-faced gloves.



HSC 7.34

(2) Safety spectacles or screens should be worn for protection when tree limbs or brush could cause injury to the eyes.

(3) Extreme care SHALL be used in transporting employees by vehicle. See Truck Driving and Emergency Driving. HSC 2.12 2.13

(4) Workers SHALL be guided to and from their work. They SHALL NOT work alone until leader is sure they are qualified to do so.

(5) Checkers and other personnel who work independently SHALL leave a schedule, route and destination.

(6) Workers SHALL be trained in the use of hand-tools applicable to their work. See HAND-TOOLS, INCLUDING POWER. HSC 7.1

(7) Workers SHALL be trained to pull ribs so as to avoid back strains.  
a. Crouch down, with feet about 12 inches apart, shoulders over hips and back straight. Grasp ribs near base of plant, pull with short, steady jerks, making use of strong leg muscles.

b. If bush does not come out easily, grub it out, swinging tool away from legs and feet.



(8) Workers SHALL be trained in proper use of spraying equipment.  
a. Carry backpack spray tanks high on back to avoid back strain.  
b. Filled spray tanks are heavy. Workers SHALL be especially alert while carrying them to avoid slipping, tripping and falling.



(9) Men SHALL NOT work above one another where there is danger from rolling rocks or logs.

5.23(10) A careful review SHALL be made HSC 8.3 of the LABORATORIES AND CHEMICAL portion of the Health and Safety Code prior to using chemical hormones (e. g. 2-4-5-T) and antibiotic (e. g. Phytoactin) spray formulations. Be sure you know the chemical and its characteristics. Follow the directions on all labels of chemical compounds such as "Phytoactin," and Actidione." HSC 8.37(43)

(11) Power sprayman SHALL NOT put excessive jerking or pulling pressure on hose lines.

(12) Equipment used for oil, hormone and antibiotic spray formulations SHALL be kept in good repair including valves, containers, and hose joint seals.

a. Replace seals and washers as soon as necessary.

b. Prevent spillage and leakage.

## 5.24 GIRDLING AND THINNING METHODS COMMONLY USED

(1) Axe

HSC 7.13

(2) Tree Injector Tool

7.14(6)

(3) Little Beaver Girdler

7.18(4)

(4) Thinning crew members SHALL work at least 1 1/2 times tree height away from trees being felled by others.



## 5.25 PRUNING

(1) Pole pruners SHALL be carried in hand, with saw ahead.

(2) Workers in the pruning crew SHALL work at least 1 1/2 pole lengths part. They should wear hard hats, safety spectacles and should wear gloves for handling the pruning pole.



(3) Limbs SHALL be struck with pruning clubs from upper side only.

(4) Pruners SHALL check to be sure that there is no danger of falling limbs striking other men. Employees SHALL NOT stand directly under limbs being pruned.

(5) Tools SHALL be placed on the ground where workers will not trip or fall on them. Pruning saw SHALL have cutting edges protected when not in use.

(6) Inexperienced climbers SHALL be limited to heights of 15 feet until they have demonstrated their ability to work and climb safely. Any workman who does not adapt himself to climbing or is subject to dizziness SHALL be assigned other work immediately.

(7) Climbers SHALL comply with requirements in other Code sections.

#### 5.26 HAND PLANTING

(1) All crew members SHALL wear suitable rainproof or weatherproof clothing when needed.

(2) Crews using planting tools SHALL be trained to--

a. Be sure footing is firm before swinging.

b. Stand and swing in such a way that planting tools will not strike toes, feet, or legs.

c. Look carefully before striking to avoid having tool glance.

(3) When planting on steep ground--

a. All crew members SHALL wear nonskid boots.



5.25(3)b.

5.25 (3) b. Workers SHALL NOT work on downhill side directly below another worker.

c. All crew members SHALL be trained to avoid the dangers of rolling logs, rocks, chunks, etc., by--

1. Working in staggered lines, ever alert to danger.

2. Avoiding precariously balanced logs, chunks, and rocks. These SHALL be stabilized where practicable or tagged in advance of planting.

(4) Worker SHALL be instructed on how to avoid snag or tree dangers, danger to eyes from flying dirt, twigs, or rock chips. When strong winds or other weather conditions make work hazardous, crew SHALL be removed to a safe area or returned to camp. Hard hats SHALL be worn when there is danger from falling objects and safety spectacles should be worn when there is danger of eye injury while working in brush.

## 5.27 MACHINE PLANTING

(1) Machine SHALL be provided with foot guards that completely cover the bottom and sides of the feet. These guards should be checked frequently for any signs of breakage or other damage.

(2) A heavy screen guard SHALL be attached to the planter, to protect the operator when planting is being done in heavy brush. The rear should be unguarded so the operator can get out quickly in an emergency.

(3) If planting is being done in rough terrain or in areas of





logs or heavy brush, the machine that pulls the planter SHALL be equipped with a blade such as a V-shaped blade or angle dozer.

(4) A device such as a buzzer, an ignition cut-off switch, or drawbar release SHALL be provided for the machine operators. The signal for a stop SHALL be definitely understood by both operators.

(5) Operators SHALL wear close-fitting clothing, hard hats, and goggles or other adequate eye protection if the machine is not adequately screened for this purpose.

(6) Operators SHALL watch for sticks, logs, or brush that may poke up through openings in the machine.

(7) The power unit drawing the planting machine SHALL be confined to limited degree turns to prevent tipping over the planting machine.

(8) All tractors SHALL be equipped with upright exhaust pipes to direct exhaust gases away from tractor and planting machine operators.



(9) All tractor planting machine outfits SHALL be equipped with first aid kit (snake bite kit where appropriate). A rearview mirror should be mounted on the tractor. The unit should carry a shovel, axe, and fire extinguisher.



## 5.28 USING CHEMICALS IN THE FIELD

(1) Safety goggles, respirators, and protective clothing and lotions SHALL be used as needed.

HSC 7.37

5.28(2)

5.28 (2) No smoking or fire SHALL be allowed near solutions with flammable base.

(3) Chemicals SHALL be applied so that spray or dust is carried away from the operator.

(4) See Laboratories and Chemicals. HSC 8.3

## 5.29 TREE CLIMBING

### (1) Qualifications:

a. Climber SHALL be trained in tree felling and climbing before he is trained in tree topping. No one who has undue fear of heights SHALL climb a tree.

b. Climber SHALL be trained and supervised by qualified climber or topper until proficient.

c. Climber and groundmen SHALL be proficient in guying and rigging. They should know how to tie and when to use timber hitch, bowline, sheep shank, rolling hitch, and square knot.

d. Groundmen should be able to climb.

### (2) Safety precautions:

a. Tree SHALL be checked for soundness. Tree flaws are cankers, dead limbs, internal decay, loose bark and oblique branch unions.

b. All equipment SHALL be checked daily.

c. Weather conditions SHALL be favorable-- not too wet or too cold, no ice on trees, wind not gusty or strong.

d. Climber and groundmen SHALL work as a team.



Occasional  
Paper 1959  
So. For. Exp.  
Station



e. Safety strap or rope SHALL be fastened at all times when at work.

f. Safety belts or climbing ropes SHALL be used at all times when ascending or descending except when not practicable because tree is small or has too many branches. HSC 6.23 7.39

g. In topping trees, heavy branches that might change the fall of the top SHALL be removed first.

h. Do not top out more than can be handled safely.

i. Check the area in which the top will land.

j. Cut the corners on sides of undercut to prevent splitting.

k. Eye shields should be worn when ascending or descending.

l. Sharp edges or points of small tools SHALL be sheathed when not in use.

m. Tie-in on tree stems for let down SHALL be made at a point where there is no chance whatsoever of breakage. Four inches in diameter, outside bark, is recommended as the minimum.





## 5.3 SALES AND SCALING

### 5.31 TIMBER SALES

(1) Vehicles SHALL be parked out of the way of trucks, other equipment, and logs.

(2) Employees SHALL--

a. Stay away from the sides of loaded log trucks until after log chains have been tightened.

b. Keep well away from moving equipment and make sure the equipment operators see you before you walk up to the equipment.

c. Unless otherwise specifically instructed, keep off logging and roadbuilding equipment.

d. NOTIFY THE LOGGERS WHEN YOU ARE WORKING IN A CUTTING AREA.

e. Be alert for falling trees, snags, widow-makers, and rolling logs.

f. Never stand on a bucked tree that will be hit by a tree being felled--it may not be bucked through.

g. Never walk below an active cat road where there is danger of a loose log rolling over you.

h. Never stand in the bight of the line, particularly at tail block corners on a hi-lead setting.

i. Never cross under an active mainline or haul-back line on a hi-lead setting.

j. Stay off cold decks if possible; if you must go on them, be cautious of rolling logs.

k. Stay out of range of small uncut trees sometimes pushed over by log movement.

(3) When working in advance of road construction, employees SHALL always find out from the man in charge of the powder crew when he expects to shoot and tell him the expected time of return to the road

### 5.31(3)

location. Always sound off when nearing the powder crew's working area.

(4) No work SHALL be done in timber sale areas during period of high winds or immediately after wind storms. If caught in the woods during a heavy windstorm, get into a natural opening large enough to give protection from windthrow and falling limbs or find a sheltered draw. Stay away from wooded marshy areas and recently partial-cut areas.



### 5.32 SCALLING--GENERAL

(1) Because of differences in the lay of the ground and the wide variation in the equipment used by different operators, no two operations are exactly the same. Each scaler SHALL be guided by these rules, and SHALL continue to watch for any additional hazards that may be peculiar to some jobs.

(2) All scalers SHALL be instructed in the job hazards beforehand.

a. Scaling can be permitted on land after dark at landings and scaling platforms where a lighting system is provided to adequately light all hazards encountered in the scaling operation. An adequate lighting system is considered to be light equivalent to daylight covering the work area and SHALL be approved by the Forest Supervisor in advance of performing night work.

(3) Scaler SHALL--

a. Wear clothing and footgear suited to the country and work. Shoes SHALL lace to ankle height or above with low heels, hard toes, caked or composition soles, etc., according to where he works. Trousers SHALL be cuffless or "stagged." Hard hat SHALL be worn in the woods and at landings.

b. Have an understanding with the operator as to where and when logs are to be scaled.

c. IN WOODS SCALING, LET ALL WOODS WORKERS KNOW WHERE HE IS WORKING. BUT DO NOT DEPEND ON THEM FOR SAFETY.

d. Move to a safe place as soon as scaling is completed. Extensions in the scale book SHALL be made after moving to a safe place.

e. Wear a hard hat, preferably painted with a bright color.

(4) Standard poster sign 0-80, 44 x 16, "Attention Drivers," or equivalent, SHALL be posted at all truck scaling stations.

HSC 7.3



## 5.33 SCALING ON LAND

(1) Depending on the landing and the methods used, the safest work can often be done by scaling each turn of logs just outside of the landing, before chokers are unhooked. If arches are used, operators SHALL be instructed to drop their loads for scaling and not move them until the scaling is completed.

(2) When scaling at landings, scalers SHALL--

a. Stay clear for each turn of logs until the chokers are clear, the cat or other skiddings equipment

5. 33(2)a.

is out of the way, and the logs have stopped rolling and sliding. Do not scale on landings where logs are being moved if there is a danger of roll or slippage.

b. Arrange with operator to keep landing clear of unmerchantable logs, chunks, and small poles.

c. Keep away from running lines, moving chokers, swinging logs and rigging, and jammers or cranes in operation.

d. NEVER WALK BETWEEN TRUCK AND LOADING PLATFORM.

e. Stay clear of the loaded truck as it leaves the landing. Don't turn your back on a moving truck.

f. Choose a safe and convenient place to stand when not actually engaged in scaling. This is usually toward the front of the landing and away from turnarounds, swinging lines, and logs rolling from the deck.



(3) When scaling on trucks, scalers SHALL--

a. SCALE ON TRUCKS ONLY AFTER THE LOAD IS BOUND BY CHAINS OR CABLES, AND NEVER UNDER THE LOADER.

b. Scale only when loaded truck or car is stopped, motor turned off, and brakes set.

c. Use standard scaling ramp or platform with catwalks on both sides of truck. Provide tail and front boards where they are usable and will add to scaler's safety.

d. If scaling ramp or platform is not available, place safety ladder against load before beginning to scale. It can then be used for descending, if load was climbed from either end. (Most falling accidents occur in descending from load.)



e. Watch for unguarded exhaust stacks on trucks.

f. To avoid falls, watch for loose bark, knots or limbs, binder chains, slick spots, etc., on logs being scaled.

g. Measure large end and obtain small end diameter from taper table (or estimate) for overhanging logs if necessary.

## 5.34 SCALING ON WATER

(1) Anyone scaling on water SHALL be able to swim and be in satisfactory physical condition. Otherwise, scaler SHALL NOT work alone.

(2) A lifejacket or lifebelt SHALL be worn. The carbon-dioxide type that automatically inflates is approved.

(3) Footwear with sharp calks SHALL be worn.

(4) Only logs satisfactorily rafted, boomed, or otherwise controlled SHALL be scaled.

(5) Scaling periods shall be arranged to avoid the necessity of scaling when--

a. There are high winds, current, and tides.

b. Logs are covered with ice or snow.

c. Rafts are being towed.

d. Scaler will be excessively isolated for long periods of time and is scaling alone.









## 5.4 ROADS AND TRAILS

### 5.41 GENERAL

(1) Projects SHALL be started only after analyzing the accident potentials and making plans to meet the hazards.

a. Special instructions SHALL be prepared for situations not covered in the Health and Safety Code Handbook.

b. Foreman SHALL NOT allow men to work under unsafe conditions.

c. Plans SHALL include measures to insure public safety.

(2) Barricades, danger, detour, and warning signs SHALL be erected when the need arises and SHALL be maintained until the danger is removed. Red lights and watchman SHALL be used if traffic warrants it or hazards to the public exist, such as landslides, washouts, bridge replacements or equipment use.

### 5.42 ROADS

(1) A primary function is to keep the road as safe as possible. Minimum safety requirements of road maintenance SHALL include--



FSH 5610



FSH 5630

## 5.42(1)a.

5.42(1) a. Removing from upper road banks those trees or large rocks that may be expected to fall within the next five years.

b. Removing all down logs hanging over the upper road bank.

c. Repairing undercut roads to prevent cave-in.

d. Keeping brush back to provide adequate sight distance.

e. Replacing all damaged warning and caution signs and reflectors for bridges. See Sign Handbook. FSH 5630

f. Erect temporary warning signs when hazards cannot be removed immediately.



## 5.43 TRAILS

(1) Trail crew safety is especially important because these men work in isolated areas where outside help is not readily available in emergencies. Foremen and workers SHALL guard against these trail injury causes: unskilled use of hand tools; use of stock; falling trees, branches, logs, and rocks; falls because of poor footing or tripping; lifting; and eye injuries from branches, chips and dust. If at all possible the crew should have communications with the operating unit in case the services of a physician are urgently needed. FSH 5610.43



(2) Trail crew workers SHALL be selected for their good safety attitudes as well as their physical fitness for work in back country, and preferably should be experienced in working and living under primitive conditions.



- (3) The trail crew safety plan SHALL include--
- a. Job hazard survey.
  - b. Check on knowledge and application of Health and Safety Code.
  - c. Provision for first aid.
  - d. Thorough safety training.
  - e. Prevention of recurrence of similar injuries.



(4) Where livestock is used, at least one member of the crew SHALL be experienced and SHALL demonstrate that he is capable of handling livestock under emergency situations.

(5) Trail crew foremen SHALL be fully qualified in first aid. Crews SHALL have adequate first aid equipment for any emergency and SHALL be thoroughly briefed on how to handle serious accident situations.



(6) Special written safety instructions SHALL be prepared and followed for each piece of mechanized trail equipment. Instructions for trail graders, packers, compressors, scooters, etc., should include the correct way to load, start, operate, and stop equipment. Only well-trained and qualified operators SHALL be allowed to operate these machines.

- (7) Trail crew foreman SHALL--
- a. Be alert to spot and correct unsafe work practices and conditions.
  - b. Insist on safety on the job.

#### 5.44 SLIDES AND MUD FLOWS

(1) A watchman SHALL be designated and placed in a safe position where he has the fullest view of the

5.44(1)

hazard area involved and where his warnings can be seen and heard by all other members of the crew.

(2) Escape routes SHALL be determined in advance.

(3) As few employees as possible SHALL be exposed to the hazard.

(4) All Government-owned tools and equipment not needed in the operation SHALL be located a safe distance beyond the area exposed to danger.

(5) DURING EXTREMELY HAZARDOUS CONDITIONS, SUCH AS IN HEAVY RAINFALLS OR HIGH WINDS IN STEEP COUNTRY WITH UNSTABLE SOILS, CREWS SHALL BE KEPT AWAY FROM THE HAZARD AREA UNTIL CONDITIONS ARE MORE NORMAL, IF POSSIBLE.



## 5.5 CRUISING AND SURVEYING

### 5.51 GENERAL

(1) Work SHALL NOT be done in timber when high winds are blowing and blowdown is likely to occur.

(2) Calked or composition shoes SHALL be worn in down timber or in rough country.

(3) Extended chain or tape SHALL NOT be handled during an electrical storm.

(4) Caution SHALL be used when handling chain or tape near power and telephone lines.

(5) Workers SHALL be especially careful when walking along swamped survey lines having protruding, sharp stubs.

(6) Inexperienced crews should be kept together in traveling to and from work.

(7) One arm and one hand SHOULD be free of equipment when walking over dangerous places. When feasible, step over logs, do not walk on them, except in poisonous snake country.

(8) Pruners or brush hooks rather than axes should be used for clearing light brush and willows.

(9) Flagmen and signs SHALL be used when surveying in traffic.



## 5.52 MINERAL SURVEYS

(1) Employees SHALL NOT enter underground mine workings or deep cuts if a qualified Forest Service mineral examiner says they are not safe.

(2) Before a mineral examiner goes into the workings, he SHALL be sure that his safety equipment is in perfect order and is suited to the job. His equipment SHALL always include a hard hat; for underground workings an adequate light, auxiliary light, and candles for testing bad air. A first aid kit SHALL be readily available.



(3) Employees inexperienced in mining SHALL examine underground mining claim workings or deep cuts only when accompanied by a qualified miner, mine inspector, or mineral examiner.

(4) No examiner SHALL enter underground workings or deep pits unless his whereabouts and expected time of return are known to a responsible Forest Officer.

(5) An examiner SHALL NOT enter dangerous workings alone; he SHALL be accompanied by a helper. He SHALL especially instruct and post his helper at a strategic point, at the mouth or portal of a tunnel or shaft, or within workings where safe, and from which rescue efforts can best be carried on.



(6) Whenever nonflammable gases are suspected, the inspector, examiner,



or helper SHALL use a candle to test the underground air for oxygen before the examiner enters tunnels or shafts.

(7) Open-flame lamps, lamps, candles, or matches SHALL NOT be used or carried in mines that might have flammable gas. Entry into such mines SHALL be made only with an experienced, properly equipped mine inspector.

### 5.53 SNOW SURVEYS

(1) No employee SHALL go on snow survey work alone except where no unusual hazard is involved, such as a snow course near a main traveled highway.

(2) No one who is physically below par SHALL undertake a snow survey trip.

(3) Surveyors SHALL be equipped and clothed for this type of travel, and skilled in--

a. Using snowshoes or skis safely.

b. Specialized first aid applicable to snow travel.

c. Avalanche hazard prediction.



FSH2 2332.81

(4) The easiest and safest routes of travel SHALL be selected, avoiding travel through areas of known snowslide or avalanche hazard.

(5) Work plans should be flexible enough to utilize the safest days for travel, considering storms and snow travel conditions.

## 5.53(6)

5.53 (6) Snow courses SHALL be rerouted if unusual hazards are found, such as deep snow under a power line, or if no reasonably safe approach route is available.

(7) Long or extrahazardous over-snow trips SHALL be made as safe as possible by prearrangement. Emergency shelter and stores should be provided if there is a possibility that the party will need to stay out overnight. Careful arrangements SHALL be made to insure that a responsible person knows the route of travel being taken and is informed when parties leave and return.







## 5.6 FENCING

### 5.61 GENERAL

(1) Heavy gauntlet-type leather gloves SHALL be worn for work with barbed wire. The wearing of a heavy leather apron is optional. Hard hat, hard toed shoes, and safety spectacles should be worn on fencing jobs.



(2) Posts SHALL be laid up and down slope to prevent rolling.

(3) On fence work where the wire is being installed, work SHALL be stopped and workers SHALL get away from fence when lightning storms are in progress. HSC 3.4

(4) Before crawling under a fence, the objects being carried SHALL be placed on the other side.

(5) Wire fences, using wood posts, should be grounded every hundred yards by steel posts to protect humans and livestock from lightning.

(6) Workers handling treated wooden posts should take precautions to keep the posts from touching their skin. HSC 5.7

### 5.62 HANDLING WIRE

(1) End of wire SHALL be firmly secured when wire is unrolled from spool. Side guards on spool roller SHALL be used to prevent side lash. Spool SHALL be kept level while unrolling wire. Wire distributors, mounted on hand trucks, rear of tractors,

## 5.62(1)

and on trailers pulled by tractors or trucks SHALL be kept in proper adjustment. Operators SHALL be given training to handle the special equipment so that all crew members understand the operation. Forward movement of the distributor SHALL be controlled by one man who is responsible for coordination of the work with crew members. Crew members SHALL take safe positions to avoid whiplash and backlash of wire from spools drawn under tension by power equipment.



(2) Wire SHALL be secured on both sides of pliers to prevent backlash when cutting wire under tension.



(3) Arm SHALL NOT be placed over or under line wire to steady post while driving staple.

(4) Staples SHALL NOT be driven to where the galvanized coating on the wire is damaged, as wire can easily be severed with chance of injury to workers along the line.

(5) Smooth wire SHALL be used to make gate-post loops where wire gates are used in fence. Top gate wire should be smooth in the panel next to closing device. Wood toggle with smooth wire should be installed for closing gate.

(6) On projects where metal posts are used, a commercial post driver should be used, or a driver should be made of a pipe that will slide over the post. The pipe should be about 42 inches long, weigh about 15 pounds and have one end closed by welding.

## 5.63 STRETCHING WIRE

(1) Kinks SHALL be removed by straightening before wire is stretched.

(2) Old wire SHALL be checked for nicks, weak spots, and splices before stretching.

(3) Stretchers of heavy construction with ropes not smaller than 1/2 inch SHALL be used.

a. Worn ropes and wire clamps SHALL be replaced at regular intervals or as needed.

b. Machine power SHALL NOT be used to stretch wire except for regular fence building machines.

(4) All workmen not needed in the stretching operation SHALL stay in the clear of wire while it is being stretched.

(5) Not more than 1/4 mile of wire SHALL be stretched at one time. In rough country, limit span of stretch between another post and stretcher to distance that can be seen. Old wire SHALL never be stretched more than a maximum of 100 yards.

(6) Top wire SHALL be stretched first.

(7) When stretching wire on sidehills, spool SHALL be secure, with no chance of rolling onto workers.

(8) When stretching wire, visual signals SHALL be used when there is any doubt about hearing verbal signals because of distance, wind, or other obstacles.



5.63(9)

5.63 (9) Wire SHALL NOT be stretched to breaking point.

(10) Hammer, pliers, or stick SHALL be used to hold wire in place while attaching weights, stapling, or releasing from obstacles.

(11) Pliers or a stick SHALL be used to pull down wire that is stretched across a depression, or to release it from obstacles.

(12) When releasing wire from obstacles, employees SHALL stay on side of post opposite from wire.





## 5.7 WOOD PRESERVING

### 5.71 BURNS AND SKIN IRRITATION PREVENTION

#### (1) Oil-Type Preservatives

##### a. Creosote Preservatives

1. Shirt sleeves SHALL be rolled down.
2. Gloves that creosote cannot penetrate SHALL be worn.
3. Neck SHALL be covered by turning up collar or wearing handkerchief.
4. Trouser legs SHALL be rolled down over ankles and boot tops.
5. Exposed portions of skin SHALL be covered with protective creams or yellow vaseline.
6. Sunburn lotion and sunglasses should be used for protection from creosote reflection on bright days.
7. Hands and face SHALL be washed thoroughly with soap and hot water immediately after work or earliest opportunity if preservative dust or solution falls on bare skin. Grease SHALL be removed.
8. Hands or clothing that have preservative dust or solution on them SHALL be kept away from eyes. If solutions or dusts fall in eyes, employee SHALL wash eyes immediately with abundant clean water for several minutes. SHOULD see a doctor at earliest opportunity.



## 5.71(1)9.

5.71(1) 9. Employees SHALL change to fresh clothes after workday. Clothes that become soiled with preservatives SHALL be laundered frequently but separately from other routinely soiled clothes to prevent discoloration HSC 8.31(3) of fabrics. Clothing in contact with salt and poisonous-type preservatives SHOULD be rinsed in clean water after each workday to dissolve salts and decrease toxicity.

b. Pentachlorophenol Preservatives (poisonous when taken internally)

Precautionary measures SHALL be as for creosote and:

1. Employees SHALL NOT HSC 8.37 inhale preservative dust. SHALL see doctor at earliest opportunity if burning or irritation of nose, mouth, and throat occurs, and immediately if nauseated.

2. Water-Soluble Preservatives (poisonous when taken internally), are zinc chloride, copper sulfate, sodium fluoride, Tanalith, Osmose Salts.

Precautionary measures SHALL be as for pentachlorophenol preservatives.

## 5.72 OPERATIONS

### (1) Creosote

a. Workmen with fair skin and light hair should be used where they are not in frequent contact with creosote.

b. Rubbing alcohol and cotton SHALL be available for washing off creosote.



c. Precautions SHALL be taken to avoid the addition of water, snow or very wet posts or poles to hot creosote, to prevent foaming or surging.

d. A 1-inch air space for expansion of creosote SHALL be left when storing creosote in drums.

e. Timbers SHALL be piled or removed in tiers; also blocked to prevent rolling.

(2) Pentachlorophenol and Water-Soluble Salts.

a. Employees SHALL follow manufacturer's instructions for mixing or handling.

b. Mixing of solutions SHALL be by placing compound into water, and SHOULD be in an area of as little wind as possible.



HSC 8.31







## 5.8 RADIOACTIVE WORK

### 5.81 GENERAL

(1) The use of radiosotopes and radiological equipment is subject to the rules and regulations of the Department of Agriculture Radiological Safety Handbook. Regional Foresters and Directors planning to use radioactive materials should correspond directly with the Radiological Safety Officer.

USDA Radiological Safety Handbook, 1961

FSH 4066.1



# CHAPTER

# 6

## Construction and Maintenance



— Blasting



Radio and Telephone



— Concrete and Masonry



Excavation



— Ladders and Scaffolds



Rigging



— Welding





## CHAPTER 6. CONSTRUCTION AND MAINTENANCE

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## 6.1 BLASTING

### 6.11 GENERAL

(1) All explosives work SHALL be done only under the direct supervision of a blaster, with a current Blaster's License, certified as such after passing an examination and field demonstration on handling, storage, and use of explosives. Inexperienced men SHALL be trained by an experienced man.

a. Authorization to issue Blaster's License. Blaster Examiners, qualified as instructors, SHALL conduct examinations and Practical Field Tests of all individuals whose work requires handling or use of explosives. Blaster Examiners SHALL recommend that the proper license be issued to applicants who meet the requirements.



b. Issuance. Forest Supervisors SHALL issue or renew Blasters License (M-5295 Rev. Jan. 1956) only on recommendation of the Blaster Examiner.

c. Renewal. Blaster Examiners have the authority to require re-examination in any or all phases before recommending the renewal of a Blaster License.

d. Qualifications of Applicants. All applicants must hold a valid first aid card. All applicants will be judged on demonstrated knowledge and willingness to comply with all safety rules. The proper attitude and a willingness to place job production second to safety is more important than previous experience with explosives.

Mature judgment and knowledge of state and local regulations concerning the storage, transportation, and use of explosives are also essential.

6.11(1)e.

6.11(1) e. All applicants SHALL be required to pass a written examination on blasting fundamentals; a field test demonstrating their ability to handle explosives; and an oral examination evaluating the applicant's overall understanding of blasting principals, techniques and safety.

(2) Only electric detonators SHALL be used for exploding charges, except near power lines, radio installations, and in some avalanche control work.

HSC 6.15(4)

a. Cap fuses may be used on limited jobs remote from roads, subject to the following limitations:

and 6.21(3)

FSH 2 2332.81

1. Not more than three shots SHALL be permitted in any single blast.

2. Fuse SHALL be cut to provide a minimum of 2 minutes delay and longer if necessary, for the blaster's safety. Each lot of fuse SHALL be tested and timed prior to use.

3. State and Federal laws restricting the use of fuse in fire season SHALL be observed.

4. Units permitting use of cap fuses under the above conditions SHALL do so in writing.

(3) Only explosives listed in the Federal Supply Schedule FSC Class 1375 SHALL be used without Regional Forester's approval.

(4) All persons using explosives SHALL be familiar with and comply with Federal, State, and local laws as applicable.

(5) Company approval SHALL be secured before blasting near a power line. Where possible, current SHALL be shut off during blasting operations.



(6) All persons such as loggers, fishermen, recreationists, or residents in or near blasting areas SHALL be warned about the operation by adequate signs or personal notice.



(7) Blasters' SHALL be equipped with hard hats and safety-toe shoes.

(8) All employees with blasters' license SHOULD be issued a copy of the Safety Code and a DuPont Blasters' Handbook.

DuPont Blaster's  
Handbook  
HSC 7.34(1)

## 6.12 HANDLING

(1) Explosives SHALL be handled with extreme caution.

(2) Fire and sparks SHALL be kept away from explosives.

(3) Explosives should be handled only during daylight. If light is necessary at other times, use only electric lights. Flashlights should have nonconductive cases and SHALL NOT touch explosives.

(4) Only wooden wedges and mallets SHALL be used for opening wooden boxes of explosives.



(5) Fiberboard cases can be opened with metallic slitters provided slitter SHALL NOT touch the metallic fasteners of the case.

(6) Cases SHALL NOT be opened inside storage magazine.

## 6.12(7)

6.12 (7) Cases SHALL be lifted clear and set down carefully. One case SHALL NOT be allowed to slide over another or be dropped from one level to another.

(8) Explosives SHALL NOT be left exposed to the direct rays of the sun for longer than 1 hour.

(9) Explosives or wrappers SHALL NOT be left where children, unauthorized persons, or animals have access to them.

(10) Empty cases that have contained HSC 6.17 deteriorated explosives or powder residue SHALL NOT be reused. See Disposal.

(11) A shipment of explosives SHALL be inspected to be sure that it arrived in good condition. If any cases have been broken in transit, proceed with caution to sweep up and destroy all loose explosive and broken debris.

(12) Broken cases SHALL NOT be repaired.

## 6.13 STORAGE

(1) The location of permanent magazines SHALL be selected in accordance with the American Table of Distances which states:

*Explosives		Distance in feet when storage is not barricaded		
Pounds over	Pounds not over	Inhab. bldgs.	Rail-ways	High-ways
2	5	140	60	60
10	20	220	90	90
50	75	340	140	140

CONST. & MTCE.

BLASTING

100	125	400	160	160
200	250	510	210	210
500	600	680	270	270
1,000	1,200	850	340	330
2,000	2,500	1,090	440	360
5,000	6,000	1,460	590	470
10,000	12,000	1,750	740	540
20,000	25,000	2,110	940	630
40,000	45,000	2,680	1,140	800

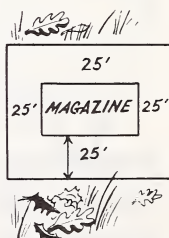
\*Interpolate distances for amounts between those above. Above distances can be reduced 50 percent if screened by natural or artificial barriers.

(2) Magazines SHALL be bulletproof, fire resistant, and well ventilated, located and constructed in accordance with Regional, State, and Federal requirements. There SHALL be a distance of at least 100 feet between dynamite and detonator houses and at least equal to two-thirds of the distance between nearby high tension line towers.

(3) Door SHALL be securely locked at all times when men are not working in magazine. An accountable record SHALL be maintained for each cap and powder magazine.

(4) Metal tools SHALL NOT be used or stored in magazines.

(5) The surrounding area SHALL be kept free of leaves, dead grass, or other flammable material, for a distance of 25 feet.



FSH 2 5630.6

6.13(6)

6.13 (6) Cleared area SHALL be conspicuously posted with white warning signs reading, "DANGER--Explosives," in letters not less than 4 inches high. If state laws require additional signs, they SHALL be posted.



(7) Electric detonators SHALL be stored in a separate magazine from other explosives.

(8) Magazine floors SHALL be swept regularly during use and magazines SHALL be kept clean at all times. If magazine floors become stained with nitroglycerine (and before starting repairs on floors) they SHALL be scrubbed well with this solution--

- 1 1/2 quarts of water
- 3 1/2 quarts of denatured

alcohol

1 quart of acetone

1 pound of 60% commercial sodium sulfide.

Dissolve the sodium sulfide in the water before adding the alcohol and acetone. Use plenty of the cleaning solution to thoroughly decompose the nitroglycerine. Scrub well with a stiff broom or brush.



(9) Explosives SHALL be stored at least 5 inches from walls for ventilation with top side up so that cartridges will not be on end. It is not necessary to turn explosives boxes in storage.

(10) Different grades of explosives SHALL be stored in different piles so that brand and grade can be plainly seen without shifting piles. Oldest stock SHALL be placed so that it will be available for earliest use.

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(11) Explosives used on jobs DuPont Blaster's Handbook  
that can be reached by trucks  
SHALL be stored in temporary  
explosives and detonator magazines, constructed ac-  
cording to specifications in DuPont Blaster's  
Handbook.

(12) Temporary magazines SHALL consist of--

a. Box, of double wall construction, with a  
5-inch sandfilled space on all sides and a heavy double  
board lid not less than 2 inches thick. Exterior of  
magazine and lid SHALL be covered with not less than  
24-gauge iron. Or--

b. Two-inch plank box covered with a heavy  
double board lid not less than 2 inches thick. Exterior  
of magazine and lid SHALL be covered with 16-gauge  
or heavier flat iron.

c. Magazine lid SHALL be hinged, hasped,  
and provided with a substantial lock.

(13) Temporary magazines or daily  
supplies SHALL be posted and located  
under or behind natural or artificial  
barriers such as heavy timber ridges,  
or embankments.



(14) On small jobs, such as trails  
in the back country where explosives are  
transported by pack train, explosives  
and detonators SHALL be stored sepa- HSC 6.13(5)  
rately behind natural or prepared bullet- 6.13(6)  
proof barriers. They should be protected  
from the weather by waterproofed canvas if possible.  
Storage area SHALL be cleared and posted.

(15) All explosives SHALL be stored in permanent  
or temporary magazines, except as provided in (14)  
above.

## 6.14 TRANSPORTATION

(1) Trucks used for transporting explosives including detonators SHALL have signs "EXPLOSIVES" in red letters not less than 4 inches high on front and rear ends and both sides, in addition to two red flags on the front.



(2) Trucks SHALL be of ample size for the load and in first-class operating condition, preferably of the closed-body type. Open trucks may be used only if the explosives are protected with waterproof and, if possible, fire-proof tarpaulin. Trucks SHALL carry reflector signs or electric flares.

(3) Packages of explosives showing stain from interior leakage SHALL NOT be hauled in any vehicle.

(4) Truck SHALL be provided with two pressure powder-type or CO<sub>2</sub> fire extinguishers. These SHALL be tested frequently, depending on the number of trips made.

HSC 3.28(1)



(5) Trucks SHALL have sides high enough to prevent packages from falling off.

(6) Trucks should have wooden floors. Any metal in body likely to come in contact with cases SHALL be covered with wood or waterproof canvas.

(7) Detonators SHALL be transported with other explosives in same vehicle or by the same man only

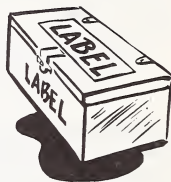


under these conditions specially authorized by Regional Foresters or Station Directors:

a. Not more than 1 day's supply SHALL be so moved.

b. Dynamite SHALL be carried in the back of truck or pickup, detonators in the cab on the floor.

c. Detonators SHALL be carried in original container, in a box made of 2-inch lumber lined with 1/2 inch of padding, or in a box made of not less than 16-gauge sheet metal lined with wood not less than 3/8 inch thick so no metal is exposed inside. Hinged cover, fastener, and label SHALL be required.



(8) Detonators SHALL NOT be carried in a vehicle equipped with a 2-way radio, unless in a 16-gauge iron box. The radio transmitter SHALL be turned off when caps are either placed into or removed from the box.

HSC 6.14(7)

(9) Unboxed metal tools, firearms, cartridges, acids, flammable substances, storage batteries, chemicals, or corrosive materials SHALL NOT be carried in same truck body with explosives.



(10) Trailers SHALL NOT be attached to trucks transporting explosives or used to haul explosives.

(11) Loads SHALL NOT exceed the rated capacity of the vehicle.

(12) The driver of a truck used for transporting explosives SHALL--

a. Be careful, capable, and reliable.

6.14(12)b.

6.14(12) b. Be able to read, write, and understand the English language.

c. Be familiar with and comply with the rules of the road, state and local regulations regarding the transportation of explosives.

d. Stop, look, and listen before attempting to cross any railroad tracks.

e. Avoid unnecessary stops.

f. Stop outside town for meals, preferably at a roadside restaurant, and park the truck as far as possible from traffic and parked vehicles. Driver SHALL NEVER get out of the truck or car without first stopping engine, setting brakes, and setting gearshift lever in low or reverse.

g. Avoid having truck repaired during trips. In emergencies, repairs SHALL be made only in the open air.

h. STOP the truck engine before putting gasoline in the tank.

i. Have current Blaster's License for storage and transportation of explosives.

j. A record account SHALL be kept of all caps and explosives; checked in and out of the magazine; as loading progresses and account for all explosives indicating disposition of same at the end of each day. This record will be kept in a suitable notebook used expressly for this purpose.

(13) Driver SHALL NOT--

a. Smoke while driving the truck.

b. Carry firearms or loaded cartridges while driving.

c. Permit unauthorized persons to ride on the truck. Limit to one helper.



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- d. Coast downhill out of gear.
- e. Leave truck containing explosives un-guarded.

(14) Animal transportation SHALL provide for-- HSC 6.11(2)a

- a. Detonators and dynamite on separate animals.
- b. Detonators in original containers, well-wrapped and padded, and packed with nonmetallic articles such as bed rolls and tents.
- c. Dynamite roped and tied.
- d. Signing is not necessary in a pack string.

(15) Trail cargo carriers transporting explosives SHALL provide for--

- a. Displaying one "EXPLOSIVES" sign prominently, with letters not less than 4 inches high.
- b. A load consisting of explosives only, not exceeding 200 pounds. Explosives SHALL be covered on four sides by fire-resistant tarpaulin and hauled in original container.
- c. One pressure-type dry powder or CO<sub>2</sub> fire extinguisher.
- d. Not carrying detonators in the cargo carrier.
- e. Carrying not to exceed 50 pounds of explosives in a mixed load, comprised of gasoline, tools, etc. When transported in a mixed load, the dynamite SHALL be packed in a metal box with sponge rubber lining and a hinged lid and hasp for locking. Provision SHALL be made for confining the powder in the box to prevent movement. The box SHALL be painted red and the word "EXPLOSIVES" SHALL be stenciled on top in 2-inch white letters. The box SHALL be carried in the bottom and at the front of the carrier, away from the engine.
- f. Removing explosives from the carrier on all overnight stops and storing them in an area naturally barricaded from the camping area.

## 6.15 USE

(1) A sign--"CAUTION--BLASTING AHEAD, TURNOFF RADIO TRANSMITTERS"--or one with similar wording, SHALL be posted on all roads and trails leading to any active blasting operations. These signs should be not closer than 700 feet from the blasting, and usually not farther than 1,000 feet.



## (2) Preparation:

a. When preparing primers from half cartridges, the cartridge SHALL be cut in half first and then each half SHALL be primed separately.

b. Primers SHALL be prepared for loading each hole or series of holes, only as needed.

c. Primers SHALL NOT be prepared or stored in a magazine, or carried over to the next day.

d. Loose electric detonators SHALL NOT be carried in pockets of clothing or in the same container with dynamite.

e. Where practicable, the blasting machine SHALL be kept in a moistureproof, locked box and removed only when used. Where this cannot be done, machine SHALL be in a locked box overnight.

1. On the job, the blaster SHALL remove the handle of 10-hole machine, and always keep larger ones locked when not in use.

2. The machine SHALL be tested at the start of the project against a rheostat to see if the full electric energy is developed.

3. It SHALL fire without failure at least two times in succession two electric detonators in series, through resistance as follows:

32 ohms for 10-cap machines  
144 ohms for 30-cap machines

208 ohms for 50-cap machines or tested with standard rheostat reading in caps.

4. The safe capacity SHALL be noted on a tag placed on the inside cover of box.

f. If available, a wiring diagram SHALL be kept with the rheostat.

(3) Electric detonators within 300 feet of any 2-way radio transmitter SHALL be tightly enclosed in a metal-encased box. Can SHALL NOT be opened when transmitter is in use. HSC 6.14

(4) In areas of high risk from electricity escaping from power lines or other sources of extraneous electricity, explosive experts SHALL use primacord in place of wiring, within the range considered hazardous by power company operators; or, fire hazard permitting, use caps and fuse on work actually under or within 300 feet of an electric transmission line where the current cannot be shut off or within 300 feet of a permanent radio transmitting station when such work has been approved by the operating power or radio broadcasting company.

(5) Loading:

a. Only blunt wooden rods SHALL be used for placing cartridges or tamping stemming material.

b. Cartridges SHALL be slit with a knife so that gentle pressure will expand them to fill this hole by tamping lightly.

c. The last half of stemming material SHALL be tamped firmly in place.

d. Detonator wires SHALL NOT touch or cross each other any more than necessary.

e. Remember that mud capping and shallow shots throw material farther than deep, heavy shots.

f. Holes SHALL NOT be loaded during a thunder or dust storm.

1. If holes are loaded and a storm occurs, the danger area SHALL be kept clear and

flagmen posted the same as when shots are fired, except that traffic SHALL NOT be held up unless the road is adjacent to the loaded holes.

2. If holes are loaded but not connected to the lead wire, the detonator wires SHALL be twisted together.

g. If necessary to leave overnight, the ends of the detonator wire SHALL be twisted together, coiled, and covered with dirt.

h. Every hole or surface shot SHALL be marked with a 6-inch red cloth at time of loading.

i. Cloth SHALL be removed when circuit is tested before attaching detonator wire. Where more than one powder man has been loading holes in the same area, all SHALL accompany the blaster to be sure all charges of each powder man are connected in the circuit.

j. The blaster SHALL be the last man to leave the danger area so that he can assure himself that everyone is in a safe location. He SHALL also be held responsible for posting flagmen and warning signs, notifying every person and all traffic in the danger area, and shouting all warning signals.

k. The blaster SHALL wait at least 2 hours before loading a sprung hole. A hole SHALL NOT be sprung next to a loaded hole.

(6) Wiring:

a. All caps SHALL be wired in series, or balanced series in parallel with a maximum of 3 series of 15 caps each wired in parallel for a 50-cap blasting machine that has been tested with 208 ohms resistance. No more caps SHALL be wired in one series than the current rated capacity of the blasting machine. Except blasters fully qualified in wiring are permitted to fire balanced series in parallel exceeding the rated capacity of the blasting machine with the

maximum load not to exceed 3 series of 25 caps each and the 3 series wired in parallel.

b. Only standard covered 14-gauge single strand or duplex wire SHALL be used, with no bare joints. Splices SHALL be taped and supported off the ground.

c. After lead wires have been wired into the circuit and all connections are tight and the wire clean, and before they are attached to the blasting machine, the circuit SHALL be checked with a blasting galvanometer to see if it is closed.

d. If the blasting galvanometer test is OK and the shot is ready to be made, the handle of the blasting machine SHALL be vigorously pushed down three or four times to warm up the generator before the lead wires are connected to the machine.

e. Detonators SHALL be kept shorted out by twisting together the bare ends of the wires until ready to connect in series.

f. Only detonators of the same manufacture SHALL be used in the same circuit.

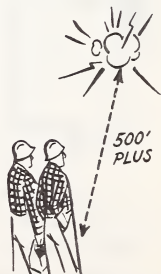
g. Each detonator SHALL be tested before the primer is prepared--

1. Scrape ends of detonator wires clean.

2. Touch them to contact parts of blasting galvanometer.

3. If needle swings across scale, detonator is OK. Each detonator SHALL be tested, as above, immediately after tamping bore hole.

h. Sufficient lead wire SHALL be provided to permit the blaster and crew to be at least 500 feet distant air-line from the nearest shot, unless blastproof areas are provided at a safe distance from the danger area. Crew SHALL NOT be allowed to return until blaster has assured himself that there are no misfires or delayed shots.



6.15(6)i.

6.15(6) i. Lead wires and detonator wires SHALL be prevented from contacting any part of a telephone line, transmission line, or other electric installation.

j. The blaster in charge of the shot SHALL connect the wires to the blasting machine.

k. Attach caps to primacord in the manner recommended by the manufacturer.

(7) Firing:

a. VEHICLE AND PEDESTRIAN TRAFFIC APPROACHING THE BLASTING AREA SHALL BE STOPPED ON ROADS AT LEAST 700 AIRLINE FEET FROM THE BLASTING AREA, AND DRIVERS AND PASSENGERS SHALL BE URGED TO STAND OUTSIDE CARS DURING THE BLAST.



b. A warning cry of "Fire" SHALL be shouted three times by the blaster before each shot, sufficiently in advance to permit all persons to reach a point of safety. He SHALL call "Fire" first after he has checked the circuit with the galvanometer and after connecting wires are attached to lead wires, second when he reaches the battery and before he attaches the lead wire to the blasting machine, and third, after he hooks up the lead wires to the blasting machine and just before he fires the charge. Flagmen SHALL answer each time to the warning cry of "Fire" to make sure the warning is heard.



c. The blaster and all employees SHALL face the blast, with backs to the sun if possible, to give the best chance to watch for and avoid flying matter.

d. IMMEDIATELY AFTER THE BLAST, THE LEAD WIRES SHALL BE DISCONNECTED FROM

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THE MACHINE AND THE BARE ENDS TWISTED TOGETHER, AND THE MACHINE SHALL BE PUT BACK IN A LOCKED BOX UNTIL 6.15(2)e NEEDED.

e. Before work is resumed after a blast, wires SHALL be traced by the blaster through the broken rock and a search SHALL be made for any unexploded cartridges and misfires.

f. The blaster SHALL give a positive "all clear" signal before men return or traffic is resumed.

g. Allow sufficient time for smoke and fumes to dissipate before returning to blasting area.

(8) For avalanche control by blasting, see Avalanche Handbook; for radio use and blasting, and for machine equipment and blasting.

FSH 2 2332.81

HSC 6.14(8)

6.15(3)

6.21(3)

## 6.16 MISFIRES

7.21a(5)

(1) There SHALL be a waiting period of at least an hour before returning to a misfire if some of the shots did not explode, and at least 15 minutes for single shots. If the misfire is considered to be electrical trouble, disconnect the lead wires and check again with the galvanometer for a load exceeding the firing capacity of the blasting machine, and for a broken or grounded circuit before going back to the danger area to recheck the wiring.

(2) If there is any reason to believe a charge is burning in a hole, the blaster SHALL have everybody removed from the danger area and the area SHALL be posted and guarded for 12 hours.



(3) If a misfire is in a mudcap or shallow shot, another detonator SHALL be inserted into the shot and fired again.

6.16(4)

6.16 (4) If a misfire is in solid material and has been stemmed with water, another primer SHALL be prepared, placed on top of the first charge, and fired again.

(5) If a misfire is in solid material and has been stemmed or tamped with dirt or clay, the packing or stemming material SHALL be blown out with compressed air and a stiff rubber hose or bronze pipe nozzle. When enough of the stemming material has been removed to expose the explosives in the hole, another primer SHALL be prepared and placed, and the blast SHALL be refired.

(6) An attempt SHALL be made to detonate a misfire by drilling a nearby hole, loading, and firing only when the foregoing methods cannot be successfully used. This SHALL be done only under the direct supervision of the most experienced blaster.

(7) If the missed hole is on a flat rock or a slightly sloping face, the newly drilled hole SHALL be back of and at least one foot above the missed hole. Extreme care SHALL be taken to insure that the newly drilled hole is parallel to or at a slight angle from the missed hole.

(8) When necessary to drill another hole on a vertical rock face, it should be at least a foot in front of and above the missed hole. The distance SHALL depend on the probable radius of the sprung hole and the angle of the drilled hole. Never drill behind or below it, or into the misfired charge.

(9) After the blast, a careful search SHALL be made for undetonated explosives.



## 6.17 DISPOSAL

### (1) Dynamite:

a. Sweepings from cars, shipping and magazine floors, and all deteriorated dynamite which is soft and mushy, or which shows nitroglycerin stains, and dynamite in cases that are discolored due to leakage SHALL be destroyed by burning at least 200 feet away from cars, buildings, and highways.

b. The dynamite or cases thereof SHALL be removed at least 200 feet to a safe distance and opened, with wooden wedges and mallets only. Special care SHALL be used if there are any signs of leaking.

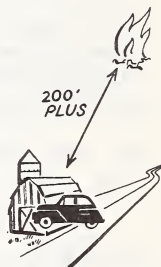
c. Small amounts SHALL be destroyed by exploding them in a safe place. Larger quantities can be burned.

1. The amount burned at any one time SHALL NOT be more than 50 pounds, depending on local conditions. A new site SHALL be selected if more is to be destroyed.

2. Gelatins are particularly prone to detonate on burning, so not more than 10 pounds SHALL be destroyed at a time.

3. Dynamite SHALL NOT be burned in cases or deep piles.

4. The most practical way to prepare the disposal bed is to cut shallow trenches in mineral soil in an open area, similar to an old gravel pit, with a motor grader. The trenches should be at least 50 feet apart, about 2 feet wide, and not over 100 feet long with dirt rolled out so that it can be spread back over the burned powder after it is cold. The cartridges SHALL be removed, slit, and spread not more than 3 inches thick in the trench, preferably with a mat of loose paper or excelsior underneath them.



6.17(1)c.5.

6.17(1)c. 5. If the dynamite is wet and does not burn readily, pour a little kerosene, never gasoline, over it before any of powder is ignited.

6. The pile SHALL be ignited by a small pilot fire of paper or wood shavings. This SHALL be arranged so that it will have to burn several feet, preferably against the wind, before it reaches any explosive material. The operator SHALL reach a place of safety before there is any possibility of an explosion.

d. There SHALL be no smoking or open lights.

e. Dynamite SHALL NOT be placed on hot ground.

f. Nobody SHALL return until there is no smoke and flame and the debris is cool.

g. Burning or hot explosives SHALL NOT be stirred, nor SHALL more explosives be added after burning has started.

h. The ground where the dynamite was destroyed SHALL be plowed as soon as it has burned, first making sure that all explosive material has been consumed and the ground is cool.

i. Empty cases SHALL be piled and burned separately.

(2) Detonators:

a. Employees SHALL NOT tamper with detonators in any manner.

b. Detonators that have deteriorated or have been proved defective by galvanometer tests SHALL be destroyed by explosion with dynamite under some confinement. Corrosion is a sure sign of deterioration.

c. Detonators SHALL NOT be thrown into small lakes or bodies of water such as rivers, creeks,

ponds, wells, or water-filled, abandoned quarries. They SHALL be destroyed this way--

1. First cut the wires off about 1 inch from the tops of the detonators, preferably with a pair of tin snips, one detonator at a time.

2. Not more than 100 detonators SHALL be placed in a box or paper bag, primed with about 1/2 pound of dynamite and a good electric detonator. This SHALL be buried under paper and dry sand or fine dirt, in a hole at least 6 inches deep.

3. This SHALL be fired from a safe distance with a blasting machine.

4. Not more than 100 detonators SHALL be fired at one time.

5. The ground around the shot SHALL be thoroughly examined to be sure no unexploded detonators remain.

6. The same hole SHALL NOT be used for successive shots unless the entire inside surface of the hole feels cool to the touch.



100  
DETONATORS  
ONLY!





## 6.2 RADIO AND TELEPHONE

### 6.21 RADIO

(1) Because of the high voltages in certain circuits, only radio technicians or others specially instructed SHALL be allowed access in AC-powered equipment.

a. AC cabinet SHALL be locked, and the key SHALL be available only to radio technicians or others specially instructed and authorized.

(2) During lightning storms, operator SHALL--

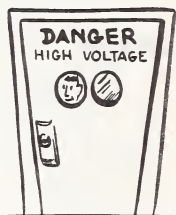
a. Never use any radio except from within a rubber tired vehicle if storm is within 1 mile.

b. Extend antenna on back-pack set only when storm is over a mile away.

(3) A radio transmitter SHALL NOT be used within 300 feet of any electric blasting or areas where electric detonators are handled or stored.

(4) Insulating platforms or rubber mats SHALL be provided in radio repair shops.

(5) See Lightning Protection Handbook, p. 10, for installation of broadcast receivers in lookout towers.



HSC 3.42  
3.43



HSC 6.14



5651.63b

## 6.21(6)

(6) Whip antennas SHALL be provided with safety knob, closed loops, or other protective device to prevent injury when not extended.

(7) Technicians SHALL be physically well qualified and specifically trained before climbing in high places.

(8) At least two men, when practicable, SHALL be present during work on high-powered transmitters, or when climbing towers and poles.

## 6.22 TELEPHONE LINE, C&M--GENERAL

(1) All on-the job instructions SHALL be given by the project foreman.

(2) Before starting on any job, all essential tools, equipment, and supplies SHALL be checked. They SHALL be repaired or replaced prior to use if unsafe.

(3) All installations having possible conflict with power lines SHALL be carefully planned so that there is no danger to personnel working on telephone circuits.

(4) Employees SHALL--

a. Have thorough knowledge of location and hazards of telephone and power lines.

b. Check with power company before testing for trouble on lines crossing or close to power lines. If a power line short exists, the company SHALL correct it.



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RADIO AND TELEPHONE

c. Stay away from wires if there is any reason to believe they might be dangerous.

d. Never go above the top telephone wires for any reason when working on jointly used poles.

(5) Where 99a arresters are being installed, the connection to neutral wire of the power system SHALL be made only by power company workmen except where made to the ground conductor at the base of power pole.

## 6.23 TELEPHONE, C&M, EQUIPMENT

(1) Climbers SHALL be worn only when working on unstepped poles or trees. They SHALL NOT be left where persons may stumble on them or where points may be damaged.

(2) Pole gaffs should be used on poles and thin-barked trees, and tree gaffs on rough, thick-barked trees. Gaffs SHALL be kept sharp: See Telephone Handbook, for minimum dimensions to which gaffs may be sharpened.



(3) Linemen SHALL personally inspect safety belts and straps daily for worn, hard, or dry leather; pliability; worn or broken sewing; cuts; cracks; loose rivets; and worn buckles, snaps, rollers, and tongues. Protect and extend life of safety belts through periodic application of leather preservatives.



## 6.23(4)

- (4) Belts or straps SHALL be discarded if--
- a. They are cut or torn enough to affect their strength.
  - b. Leather is worn to less than 1/8-inch thickness.
  - c. There are other serious defects.

(5) Ropes and leather SHALL be kept away from acids, fumes, and strong alkalies.

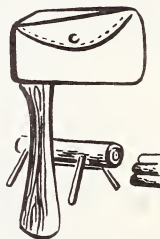
### (6) Ropes:

- a. Wire-cored safety rope SHALL be used for climbing and trimming large trees. Safety ropes SHALL be 7/8-inch Manila, 12 to 15 feet long, with a steel core of six strands of seven twisted steel wires.
- b. Ropes used for telephone constructions SHALL be of best quality Manila hemp.
- c. Rope SHALL NOT be taped or covered with other wrapping except in lieu of back splicing end to prevent unraveling.
- d. Rope SHALL be handled and stored carefully so it will not be damaged.
- e. All hand lines SHALL be examined frequently to be sure they are safe at all times.

(7) Belt hand ax SHALL be sheathed.

## 6.24 POLE AND TREE OPERATORS Telephone Handbook,

- (1) Loading and Transporting:
- a. Substantial, well-secured, and well-braced skids SHALL be provided where hand loading is necessary. Eliminate heavy lifting wherever possible.



Telephone  
Handbook



b. Poles SHALL be securely chained while hauling vehicle is in motion.



c. Red flag SHALL be attached to rear end of longest pole.

d. Men SHALL be kept away from side of load while poles are being distributed.

e. No one SHALL be allowed to ride or stand on load of poles.

## (2) Raising:

a. Pike poles and hook ladders SHALL be inspected for serviceable condition.

b. When raising a long pole, four steady pikes SHALL be used near top.

c. Poles should be held above ground line with two peavies or cant hooks to prevent roll when being raised with pike poles.

d. Plank or small pole should be used to force butt of pole into the hole when it is being raised. Don't stand on pole.



## (3) Climbing:

a. Every new employee whose duties include climbing SHALL be tested to check his ability. Those unskilled SHALL be trained in climbing techniques before being put to work. Persons who have a fear of heights SHALL NOT be assigned to climbing duties.

b. Before poles are climbed, they SHALL be examined, especially at the ground line, for rot.

1. Surface defects above ground may be detected with the naked eye, but a screw driver or a bar SHALL be used vigorously in searching for inner decay or decay below ground line.

2. If a pole seems sound but age warrants suspicion, 3/8-inch holes SHALL be bored and examined. If not necessary to remove pole, plug holes with preservative treated plugs.

3. Lineman SHALL NOT depend on testing a pole by "sounding" it with a block of wood or a heavy tool, nor by swaying it back and forth.

4. Assume that the pole is unsafe following heavy rains, frost heave, or in the case of newly set poles. HSC 6.24(8)

5. If in doubt, brace pole with four pike poles before climbing.

c. Where immediate repair work is necessary, unsafe poles SHALL be stubbed or cut off at the ground line and reset prior to climbing.

d. Signs or nails SHALL be removed from poles before climbing.

e. Climbers, gaffs, and straps SHALL be dependable and properly fitted to the legs.

f. Serviceable work gloves and high shoes SHALL be worn while climbing. Trouser legs SHALL be pulled up so that they will not snag on gaffs and knees will be free.

g. When climber is in his working position off the ground, safety belt with safety strap SHALL be properly adjusted to pole or tree.

h. The safety strap SHALL NOT be around pole or tree while lineman is moving up or down, except when there is danger of being thrown off balance by high wind or other causes. It SHALL hang free with both ends of strap snapped into one D-ring.



i. WHEN CLIMBING POLES OR TREES, SHORT STEPS SHALL BE TAKEN AND GAFF PLACED WHERE IT WILL NOT SLIP. MAKE EACH STEP DELIBERATE AND FORCEFUL, WITH KNEE BOWED OUT, AWAY FROM THE POLE.

j. Climbers SHALL be extra cautious when climbing icy, frozen, cracked, knotty, rotten, crooked, case-hardened, or especially soft poles or trees.

k. When it is necessary to climb icy poles or trees, lineman SHALL place gaffs in the icy side, climbing the pole with hands on the dried side. On stubbed poles, lineman SHALL climb on side opposite stub so he won't strike it coming down.

1. When wearing gaffs, lineman SHALL step, not jump, down from trees or poles.

2. Ladders should be used instead of climbers whenever practical. The top rung of the ladder SHALL be fastened to pole or tree before work is begun.

(4) Working aloft--

a. Safety straps SHALL be fastened at all times.

b. Crossarms, braces, pins, and small limbs SHALL NOT be used for support.

c. Safety strap SHALL be used around that portion of the pole above the top crossarm only when the pole is at least 15 inches higher than the cross-arm.



6.24(4)d.

d. Handlines SHALL be used to pass tools, equipment, and materials to and from lineman or to hang or rehang wire on insulators.

e. Ground workers SHALL stay away from trees being limbed and SHALL NOT work under tree or pole workers.



(5) Limbing:

a. When limbing a tree, workers SHALL take care to avoid cutting safety gear or themselves.

b. Pruning saws and extensions should be used wherever possible.

(6) Wire Stringing:

a. If there is danger of a pole falling, pole SHALL be guyed and braced before line wires are cut.

b. In using stretchers, workers SHALL be in the clear so that in case of slip or breakage, the ends of the wire will not whip against them.

c. On lines adjacent to high voltage lines, workers SHALL use rubber gloves, dry rope lines, and insulated tools. Telephone Handbook

d. Before repairing breaks on such lines, workers SHALL ground the line on both sides of the break. See Telephone Handbook.

e. Line workers SHALL NOT contact wire during lightning storms, even if storms are several miles distant.

f. RECOIL SHALL BE GUARDED AGAINST WHEN WIRE UNDER TENSION IS RELEASED FROM OVERHANGING TREES, BRANCHES, STUMPS, ETC. SPECIAL PRECAUTIONS ARE NEEDED NEAR POWER LINES.



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STRIVE TO RELEASE TENSIONS GRADUALLY -- GUY, TIE OR USE WIRE STRETCHERS.

g. When stringing wire across a roadway, it SHALL NOT be carried up the pole unless flagmen are stationed to halt traffic.

h. A handline SHALL be used for raising wire. Handline SHALL NOT be tied to the tool belt or body when the line wire is attached.



#### (7) Taking Up Wire:

a. When reeling up wire paralalled to a power-line, one man SHALL be at the rear to hold the wire taut so that the end will not catch and fly up into power wires.

b. Always hold to a dry rope tag line 20 feet or so in length, tied to the end of the wire being pulled.

c. Where the telephone wires are being removed from a crossing under a powerline, they SHALL be cut at the crossing and reeled in from the opposite ends.

d. After the wire is reeled up, coils SHALL be tied securely at four places and ends of the tie wires pressed into the coils before removing from the reel.

#### (8) Dismantling:

a. Poles that will not be salvaged should be sawed or chopped off rather than dug out.

b. If pole is weak, it SHALL be supported with pike poles, stubbed, or a new pole set next to old one before climbing.

c. If new pole is set, lash old and new pole together with rope.



6.24(8)d.2.

d. If old pole is not stubbed or new pole set,  
guy old pole four ways.

e. Guard against kickback when releasing  
last strain on old pole.

CONST. & MTCE.

RADIO & TELEPHONE



## 6.3 CONCRETE AND MASONRY

### 6.31 GENERAL

(1) High lines, buckets, or other rigging transporting concrete SHALL be designed and constructed so as to safely carry their maximum loads.

(2) Loaded concrete buggies and wheelbarrows should be pushed, not pulled. If necessary to pull them, rope can be attached to the front. HSC 7.18

(3) See Equipment.

### 6.32 FORM WORK

(1) Forms SHALL be designed and constructed to safely carry the wet concrete load and any other imposed load to which the form is subjected. Nails SHALL be removed from salvageable form lumber when forms are being dismantled.

(2) Mud sills SHALL be used on all shoring resting on the ground. Adequate bracing SHALL be provided for all forms.

(3) Wire ends, sharp ends of reinforcing, etc. SHALL NOT be left exposed.

(4) Men clipping ends of form tie wires should wear leather gloves.

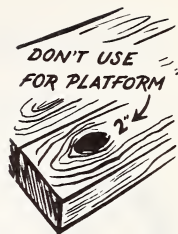




6.33

### 6.33 PLATFORMS

(1) Platforms for cement-mixer and pouring operations SHALL be constructed from sound lumber, free from large or loose knots of 2 inches or larger in diameter.

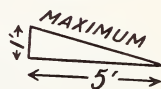


(2) Guardrails SHALL be constructed on sides of platforms that are 3 feet or more above ground level.

(3) Platforms and guardrails SHALL be inspected for weaknesses or defects at least daily.

### 6.34 RUNWAYS

(1) Elevated runways or ramps for pushing material to and from the mixer SHALL be well supported and braced. Ramps should have not more than 1 foot rise in 5 feet horizontal distance.



(2) Guardrails SHALL be provided. The minimum width of runway and clear distance between guardrails SHALL be equal to 2 feet more than the overall width of the widest equipment using the runway.

HSC 6.33(2)  
6.33(3)

(3) Stop cleats SHALL be used at all places where wheelbarrows or buggies are dumping materials.

(4) Runways SHALL be kept free of slipping hazards.



## 6.35 STONE AND BRICK MASONRY

(1) Scaffolds SHALL be of the heavy trade type, securely built, level, well braced, and equipped with railings and toeboards.

(2) Scaffolds and floors SHALL NOT be overloaded.

(3) Mortar boxes SHALL be kept free from ragged edges.

(4) Backfilling SHALL NOT be done against green walls.

(5) Workmen SHALL be provided with protective creams to avoid lime burns. Protective cream or olive oil SHALL be included in the first aid kit where men are handling lime for use when lime gets into open cuts or eyes.



## 6.36 MIXERS

(1) Skip SHALL be landed when mixer is idle or when working on it.

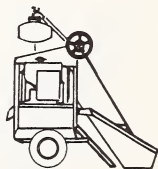
(2) Everyone SHALL be in the clear before skip is moved up or down.

(3) Cables, hoist, and brake mechanisms SHALL be inspected daily during periods of use.

(4) Power SHALL be turned off and repairs made at once before worn or defective parts cause injury.

(5) Stationary equipment SHALL be blocked and level.

(6) Waste material SHALL NOT be allowed to accumulate around mixers.







## 6.4 EXCAVATION

### 6.41 GENERAL

(1) Before excavating below foundations and footings next to buildings, you SHALL provide adequate shoring and underpinnings.

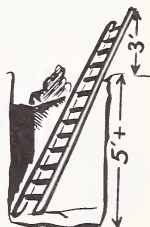
(2) Surface materials such as rocks and trees SHALL be removed if they might fall into the excavation. Excavated or other material SHALL be stored at least 2 feet from edge of excavation.

(3) Guardrails, barricades, or fences SHALL be erected to protect workers and the public from excavation hazards. Warning signs SHALL be posted. All excavations on or near public thoroughfares SHALL be marked at night by red lanterns or torches.



(4) Materials used for sheeting, sheet piling, bracing, shoring, and underpinning SHALL be in safe condition. Timbers SHALL be sound and free from large or loose knots, No. 2 Common or better.

(5) Ladders extending from the floor of excavation to 3 feet above ground level SHALL be placed at about 50-foot intervals in all excavations 5 feet or more deep.



(6) All truck driveways and areas around equipment, such as ramps to crushers, driveways under bins, wells under elevators or conveyors, overflow from grating

guards, etc., SHALL be kept clear of large rocks or other debris that might cause accidents.

(7) Barriers not less than 8 inches high SHALL be provided and anchored on firm bearing where vehicles are required to back up to open pits, hoppers, and excavations. These should be inspected frequently for weaknesses and defects.



(8) When removing a high overhanging bank, work SHALL progress from the side toward the middle. Workers SHALL always face the point of danger and wear safety belts and lifelines.

(9) Boulders SHALL be pried from above or one side to prevent injury. No workmen SHALL be below boulders being loosened.

(10) All banks SHALL be inspected frequently for cracks and earth shifts, which may indicate the beginning of slides, especially after rains or freezing weather.



(11) Worker SHALL NOT work alone in excavations or trenches. They should work 12 feet apart.

(12) Planning and construction of shoring SHALL be governed by the nature of the ground.

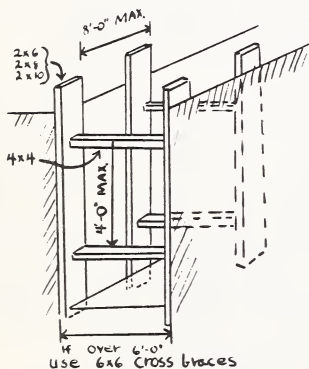
## 6.42 TRENCHES--UNSTABLE

(1) VERTICAL BANKS OF TRENCHES IN UNSTABLE OR SOFT MATERIAL 4 FEET OR MORE IN DEPTH SHALL BE SUPPORTED BY CONTINUING VERTICAL SHEET PILING AND BRACES, OR OTHER APPROVED METHOD SUCH AS VERTICAL PILING AND HORIZONTAL SHEETING.

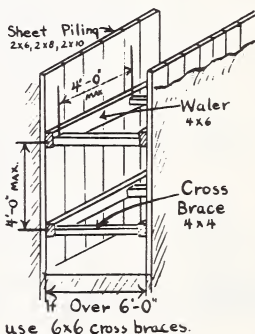
(2) Wooden sheet piling SHALL NOT be less than 2 inches thick.

(3) Sheet piling SHALL be held in place by longitudinal timbers or walers, at vertical intervals of not more than 4 feet.

(4) Walers SHALL in turn be supported by 4-by-4-inch cross braces, spaced a maximum of 4 feet.



**TRENCHES IN HARD  
COMPACT MATERIAL**



**TRENCHES IN  
UNSTABLE OR  
SOFT MATERIAL**

(5) Extra bracing SHALL be used to prevent slides or cave-in when excavations or trenches are made in old fills, next to backfilled excavations, or

6.42(5)

subjected to vibrations from railroad or highway traffic, operation of machinery, or any other source.

#### 6.43 TRENCHES--HARD, COMPACT

(1) FOR TRENCHES 5 OR MORE FEET DEEP AND 8 OR MORE FEET LONG, SIDES SHALL BE SLOPED TO ANGLE OF REPOSE OR SHALL BE VERTICALLY BRACED WITH AT LEAST 2-BY 6-INCH PLANKS OPPOSITE EACH OTHER AGAINST THE TRENCH WALL AT HORIZONTAL INTERVALS OF NOT MORE THAN 8 FEET. THIS DOES NOT APPLY TO TRENCHES IN SOLID ROCK OR HARD SHALE ON LEVEL GROUND.

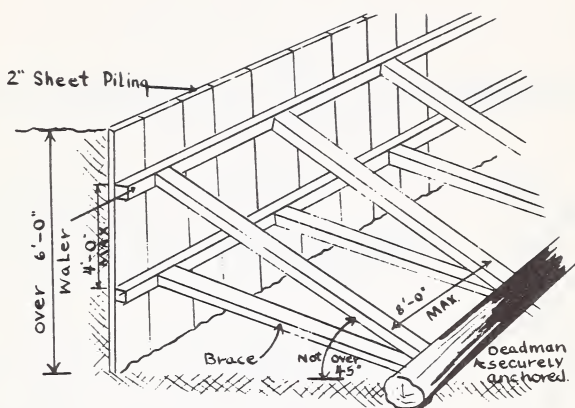


(2) These braces SHALL extend HSC 6.42(4) to trench bottom and be held in place by horizontal cross braces at right angles to both braces, cleated and tightly wedged, and of the sizes shown in sketch.

(3) Undercutting SHALL NOT exceed 6 inches on either side of trench.

#### 6.44 BULKHEADS AND RETAINING WALLS

(1) Banks over 6 feet high resulting from excavating for bulkhead construction, retaining walls, bridge abutments, wing walls, etc. SHALL be shored to protect workers, unless sloped to the angle of repose of the material.



## Bulkheads and Retaining Walls

(2) The spacing of shoring and bracing SHALL be in accordance with these standards:

### BULKHEADS AND RETAINING WALLS

Height of bank (feet)	Waler size (inches)	Brace size (inches)
6--8	4 x 4	4 x 4
8--10	4 x 6	4 x 6
10--12	6 x 6	6 x 6
Over 12	8 x 8	8 x 8

Length of braces in inches SHALL NOT exceed 60 times the least dimensions without bracing.

(3) Adequate bearing SHALL be provided at the lower end of diagonal shoring to resist the thrust of the bank above.

## 6.44(4)

6.44 (4) Long braces SHALL be centerbraced to prevent buckling, if intended to carry maximum loads, where length exceeds 60 times least dimension.

## 6.45 GRAVEL PITS

(1) Banks SHALL be sloped around the pit and at truck entrances and exits to eliminate slide danger.

(2) Overburden SHALL be stripped back from the edge of pit or bank at least 12 feet. For high banks or deep pits, the width of the stripped area SHALL be not less than one-half of the slope distance of the working face of the pit or bank.

(3) The cut bank of the overburden SHALL be sloped to at least  $45^{\circ}$ .

(4) Trees or boulders above the pit or near the edge of the overburden SHALL be removed if they could start a slide or fall into the pit.

(5) Hand-loading gravel pit or bank slopes SHALL NOT exceed the following:

<u>Bank height (feet)</u>	<u>Slope (degrees)</u>
Up to 6	90 (no overhand)
6 to 15	60
16 and up	45

In all cases where rocks 4 inches or larger are present, bank slope SHALL NOT exceed  $45^{\circ}$ .



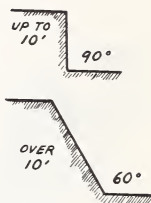
CONST. & MTCE.

EXCAVATION



(6) Bank slopes in shovel-loading gravel pits SHALL NOT exceed the following:

<u>Bank height (feet)</u>	<u>Slope (degrees)</u>
Up to 10	90 (no overhang)
Over 10	60



(7) Pit or bank faces and stripped area in old pits with banks over 4 feet high SHALL be examined before work is started.

(8) High gravel banks or deep pits SHALL be worked out in benches; all material from the top bench SHALL be removed before lower levels are worked.

(9) Special precautions:

a. Gophering and undermining SHALL be prohibited.

b. Men working on slopes exceeding 60° in hard, compact material SHALL wear safety ropes when more than 6 feet above pit floor.

c. Pits that have been blasted to loosen gravel SHALL be inspected by blasters before workmen are permitted to return.



## 6.46 QUARRIES

(1) Overburden SHALL be stripped back from top edge of quarry for a distance of at least 12 feet.

(2) The cut bank of the overburden SHALL be sloped to at least 45°.

6.46(3)

(3) Trees, snags, or large rocks that can fall into quarry SHALL be removed.



(4) Loose rock SHALL be removed (scaled) from the quarry face frequently.

a. QUARRY FACES SHALL BE EXAMINED DAILY DURING FREEZING AND THAWING WEATHER FOR ROCKS THAT MAY BE DISLODGED BY WEATHERING ACTION.

b. Scalers SHALL wear safety belts and be securely tied with safety ropes while at work.

(5) After each shot, the blaster SHALL make an examination before workmen are permitted to return to the pit.

(6) Wherever practicable, a minimum distance of 10 feet should be maintained between workmen unless 2 or more men are required to accomplish the same tasks.

(7) If possible, the face of the quarry should slope enough to eliminate the danger of falling rocks.

(8) All quarries SHALL be fenced. Danger signs, warning of the blasting activities, SHALL be posted.



(9) Special precautions:

a. Men SHALL wear safety ropes when working over 6 feet above pit floor.

b. Danger areas in quarries SHALL be barricaded as a precaution to safeguard human beings and livestock.







## 6.5 LADDERS AND SCAFFOLDS

### 6.51 LADDERS

#### A. CONSTRUCTION

(1) Ladders SHALL be constructed of thoroughly seasoned, straight-grained lumber, free from cross-grain, splits, shake, decay, or other defects. They SHALL NOT be spliced. Knots SHALL be tight, SHALL NOT exceed  $1/2$  inch in diameter, and SHALL NOT be nearer than  $1/2$  inch from edge of rail or 3 inches from a rung. Wood rungs SHALL be free of knots and SHALL be inserted in notches or holes in side rails and securely fastened, with uniform spacing, not exceeding 12 inches.

(2) All ladders SHALL be constructed to carry their intended loads safely. All weakened, worn, broken, or patched ladders SHALL be destroyed.

(3) Linseed oil or clear varnish, rather than paint, should be applied to ladder surfaces to avoid covering defects.

(4) Cleats, metal points, safety shoes, lashing or other effective means SHALL be used if there is danger of the ladder slipping.

(5) Stepladder SHALL have a locking device or spreader to hold it in open position.



## B. USE

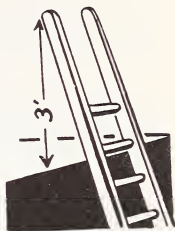
(1) Metal ladders SHALL NOT be used around electrical equipment.

(2) Ladder SHALL be set with the base out one-fourth the distance to the top support.

(3) Extension ladder should be raised to vertical position or against wall before it is extended.

(4) Ladders SHALL extend 3 feet above any landing surface.

(5) The base of a ladder being raised should be held or blocked against something solid.



(6) Ladder SHALL be faced and both hands SHALL be used when ascending or descending.

(7) Ladder SHALL be moved to a new location when person has to lean more than 1 foot to side.

(8) Ladders SHALL NOT be used in horizontal positions.

(9) Personnel SHALL NOT stand on the top two steps of ladders.

(10) Step ladders SHALL NOT be used where strenuous action by the worker is required; there is danger of overturning the ladder.

(11) Ladders for other than temporary use should be discouraged. They should be replaced by stairways, substantially built, with proper guard rails and landings.

## C. STORAGE

(1) Ladders SHALL be stored under suitable cover, protected from the weather; in a dry location away from excessive heat.

(2) They SHALL be supported in storage so they will not sag.

## 6.52 SCAFFOLDS--

### A. GENERAL

(1) Scaffolds SHALL be well made and SHALL be erected and removed only by qualified men.

(2) Lumber SHALL be carefully inspected and SHALL be strong enough for the purpose, sound, and free from large knots and other imperfections.

(3) Uprights SHALL be plumb, SHALL rest on solid footing, and SHALL be fixed at the bottom to prevent shifting.

(4) Ramps and runways SHALL be at least 20 inches wide.

(5) Stairs or ladders SHALL be provided, for safe access to scaffolds.

(6) All scaffolds SHALL have guardrails and toeboards, at least 4 inches high.

(7) Scaffolds built by one crew SHALL never be used by another crew until they have been thoroughly inspected and pronounced safe.



6. 52(8)

6. 52 (8) Overhead protection SHALL be provided if it is necessary to work under scaffolds. Scaffolds SHALL be protected against trucks striking them or dumping material against them.

(9) During the winter season, snow and ice SHALL be removed from scaffolds before work is started. Sprinkle with sand or ashes when slippery.

(10) Scaffolds SHALL NOT be overloaded nor used for storage except materials being used currently. Tools and rubbish SHALL be lowered carefully at end of each day.

(11) Scaffolds SHALL be removed immediately after the completion of the work for which they were built. All nails should be pulled from each piece of scaffolding as it is removed, and the materials should be piled neatly.



(12) This table SHALL be used as a guide in the selection of scaffold plants.

SAFE LOADS IN POUNDS FOR SCAFFOLD PLANKS\*

Span (feet)	2x6	2x8	2x10	2x12	3x10	3x12
6	108	144	182	220	536	650
8	76	102	129	156	389	472
10	56	75	95	115	293	361
12		56	72	87	235	285

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14			54	64	188	228
16				47	151	183
18					120	146
20					95	114

\*For loads concentrated in the center of the plank. They may be doubled for loads uniformly distributed over the entire length of the plank. Loads are computed for spruce or Norway pine and may be increased for Douglas-fir and longleaf yellow pine to weights obtained by multiplying these constants: Douglas-fir, 1.14, longleaf yellow pine, 1.55.

(13) Scaffolds SHALL be inspected for damage, weakness and defect at least once each working day.

(14) Damaged or weakened scaffolds SHALL be immediately repaired, and workmen SHALL NOT be allowed to use them until repairs have been completed.

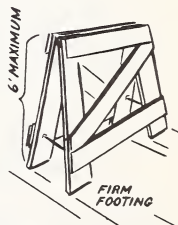
#### B. HORSE SCAFFOLDS

(1) Horse scaffolds should not exceed 6 feet in height.

(2) All legs SHALL stand securely on a solid footing.

(3) Tops of horse scaffolds SHALL be level, regardless of the height of the horse.

(4) Ramps SHALL NOT be used with horse scaffolds.



### C. SWINGING SCAFFOLDS

(1) Painters' scaffolds and other light, swinging scaffolds that are supported by ropes SHALL conform to rope and plank standards. HSC 6.27(7)  
6.52(12)

(2) Ropes SHALL be protected from sharp tools and from contact with acid and other chemicals.

(3) Swinging scaffolds SHALL always be lowered to the ground or lashed to the structure at the end of the day's work.

(4) Swinging scaffolds SHALL be provided with back rails and 5/8-inch wire rope or 3/4-inch round steel bridle at each end.

### D. RIVETING SCAFFOLDS

(1) Guardrails SHALL be provided whenever practicable and every precaution SHALL be taken to prevent accidents.

(2) All suspended riveters' scaffolds SHALL have not less than 1 1/4-inch Manila rope, or its equivalent, secured to the beams or girders to prevent slipping.

## 6.52 E. POST AND POLE SCAFFOLDS

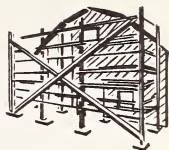
(1) The following dimensions SHALL be used as guides for pole scaffolds not more than 25 feet in height:

<u>Item</u>	<u>Heavy trades*</u>	<u>Light trades**</u>
Uprights	4x4x6' c-c	2x4 or 2x6x8' c-c
Ledgers	2 1x6 or 1 2x6	2 1x6 or 2 1x8
Ribbon (or stringer)	1 1x6 or larger	1 1x6 or larger
Handrail	1x6, 1x8, or 2x4 Place 3' above platform	1x6, 1x8 or 2x4x3' above platform
Platform	2x10 or 2x12 planks overlapping at least 1'	Not less than 2 2x10 planks over- lap 1'
Toeboard	1x6 or wider	1x6 or wider
Cross bracing	1x6 or larger	1x6 or larger
Foot blocks	2x8 or larger	2x6 or larger
Scaffold width	4'	3'
Splices on upright	4 1x4x30	2 1x4 or 2 1x6x30 or larger

\*Heavy Trades: stonemasons, bricklayers, and plasterers.

\*\*Light Trades: carpenters and painters.

6.55 E. (2) If poles are used in place of posts, the diameter SHALL NOT be smaller than the largest dimension in the corresponding members, as given above.



**LIGHT TRADES  
POLE SCAFFOLD**

Definitions: Ledgers are nailed to up-rights transversely for support of platform planks. Ribbons are nailed to inside of upright longitudinally and directly below ledgers. Toeboards are nailed to inside of outside uprights longitudinally and adjacent to top surface of platform plank.

(3) Scaffolds 25 to 64 feet high SHALL have these uprights: 4x6 inches for stonemasons; 4x4 inches for bricklayers and plasterers; and 3x4 inches for carpenters and painters.

(4) If scaffold is 6 feet high or more, uprights SHALL be extended 3 feet and guardrails attached.

(5) Cleats used to splice uprights SHALL be of sound wood not less than 30 inches long, well nailed onto adjacent sides of the uprights at the joints, with two cleats per splice.

(6) Spliced joints SHALL be staggered to provide stiffness for the entire structure.

(7) In no case SHALL scaffold flooring be less than 24 inches wide.

(8) Where concrete buggies are used on a scaffold, ledgers and planking SHALL be designed to support a concentrated load of 500 pounds in addition to the normal scaffold loading.

## F. SINGLE POLE SCAFFOLDS

(1) Single pole scaffolds, with the wall that is under construction as the inner support, SHALL be

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constructed as outlined for pole scaffolds, except that ledgers SHALL be at least 4x4 inches in size and SHALL extend at least 1 foot beyond the ribbons.

(2) Scaffolds SHALL be braced to the structure under construction or to other fixed objects.

Note: Tables from Associated General Contractors' Manual of Accident Prevention.







## 6.6 RIGGING

### 6.61 GENERAL

(1) Only qualified employees SHALL tie on, signal, or operate hoists.

(2) All employees SHALL keep away from moving lines, lines and blocks under strain, and suspended loads.

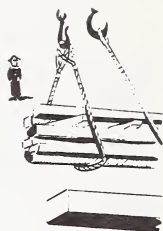
(3) The following SHALL be removed from service: Drums, sheaves, or pulleys with eccentric bores or cracked hubs, spokes, or flanges; hooks, shackles, rings, and slings that have been bent, spread, or otherwise damaged; and frayed ropes and cables.

6.62 ROPES--Manila fiber is preferable to other kinds of rope for rigging.

(1) Ropes SHALL be inspected frequently for broken strands, cuts, and worn or frayed spots. Unsafe rope SHALL be replaced.

(2) Acids and acid fumes SHALL be kept away from rope.

(3) Rope should be uncoiled from inside to prevent kinking.



6.62(4)

6.62 (4) Rope should not be dragged over rough surfaces.

(5) Rope should be dried thoroughly after use. Frozen or wet rope should not be piled against steam pipes or other heat sources.



(6) Rope should be coiled and piled or suspended so that air can circulate through the coils.

(7) Federal standards for new Manila rope:

Diameter, approx. (inches)	Breaking strength minimum (pounds)	Safe load, 1/8 maximum (pounds)
1/4	600	75
1/2	2,650	331
3/4	5,400	675
1	9,000	1,125
2	30,000	7,500

## 6.63 WIRE ROPES AND CABLES

(1) All working wire ropes and cables SHALL be inspected when installed and at least once a week when in use.

a. Each free end should be fitted with a thimble or other fitting.

b. Wire rope SHALL be removed from hoisting or load carrying when any of the following conditions exist:

1. 3 broken wires in 1 strand of 6x7.





2. 6 broken wires in 1 strand of 6x19.
3. 9 broken wires in 1 strand of 6x37.
4. 8 broken wires in 1 strand of 8x19.
5. When marked corrosion appears.



6. When 4 percent of the total number of wires in the rope are broken.

c. Leather gloves SHALL be worn while handling wire ropes or cables.



(2) Cables having broken or frayed strands SHALL be replaced. The new cable strength SHALL be equal to the original, and strands SHALL be twisted in the same direction.

(3) Wire ropes that have been kinked SHALL be considered unsafe.



(4) Ropes SHALL be untwisted or unlaidd only for splicing purposes.

(5) Worn ropes SHALL NOT be used as line running over sheaves or drums.

(6) Wire rope should be lubricated regularly to avoid excessive internal strains and rusting.

(7) The working load of a wire rope SHALL NOT exceed one-sixth of its breaking strength (a safety factor of 6). The factor of safety SHALL be determined by careful consideration of all data, such as the load, speed, size, arrangement, HSC 6.67(4)



6.63(7)

and number of sheaves and drums, and the degree of danger to life and property.

See sheaves, tackle blocks, and pulleys. HSC 6.67(4)

(8) Guards SHALL be provided at all points where persons or materials might come in contact with moving rope.

(9) Wire ropes SHALL be fastened to drums only by zinc plugs or suitable clamps.

(10) Wire rope should not overwrap unevenly on drums.

(11) Wire rope only of a size that will fit into pulley and sheave grooves properly SHALL be used. If necessary, pulleys and sheaves SHALL be regrooved to size.

(12) Hands SHALL be kept off cable feeding a drum, pulley, or sheave.

(13) All clamps SHALL be attached with the "U" over short end of cable.

(14) Clamp nuts SHALL be inspected and tightened frequently.



(15) APPROXIMATE BREAKING STRENGTH  
OF WIRE ROPE IN TONS (2,000 POUNDS).

Diameter of cable (inches)	Material			
	Iron	Cast steel	Mild plow steel	Plow steel
1/4	1.0	1.8	2.0	2.2
5/8	5.5	10.4	11.4	12.5
3/4	7.8	14.8	16.3	17.8
7/8	10.6	20.0	22.0	24.0
1	13.7	26.0	28.6	31.2
1-1/8	17.2	32.8	36.0	39.4
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1-1/2	29.7	57.5	63.3	69.0

## 6.64 CHAINS

(1) Chains SHALL be inspected frequently for small cracks, corrosion, pits, signs of crystallization, and deformed, stretched, weak, or gouged links, and SHALL be replaced if in weakened or doubtful condition.



(2) Sudden shocks and overloading SHALL be avoided.

(3) Chains SHALL NOT be kinked or knotted.



(4) After hitching or hooking chains or cables to objects such as, logs, stumps, or machines, everybody SHALL stand clear and as far away from the tractor or load as the length of chain between them.

6.64(5)

6.64 (5) Chains that have been stiffened or stretched by overloading SHALL be condemned.

(6) The hook SHALL be completely over a link so chain cannot slip and hook will not be bent, and as far from the load as possible, so the pull is on the back of hook; then a straight steady pull SHALL be made.

(7) Safe load in tons for iron chain is six times the square of the chain stock in inches.

## 6.65 CHAIN BLOCK HOISTS

(1) Running gear, hooks, straps, and chains SHALL be inspected for cracks and other signs of fatigue, to make sure they will not slip or give way under strain.

(2) Overhead support and rigging SHALL be sufficiently strong to carry maximum loads with ample safety factor of  $2\frac{1}{2}$  to 1.

(3) Chain block SHALL be side-pulled only when superstructure is braced to withstand lateral strain.

(4) Heavy loads should be guided with ropes rather than by hand.

## 6.66 HAND HOISTS

(1) Operators SHALL act only on signals clearly understood by everyone concerned.



CONST. & MTCE.

RIGGING

(2) Ratchet pawl SHALL be engaged when loads are lifted or suspended.

(3) Crank SHALL be removed when a load is suspended.

(4) Operator SHALL have a free floating grip on crank handle so that thumb cannot be broken.



## 6.67 SHEAVES, TACKLE BLOCKS, AND PULLEYS

(1) They SHALL be inspected immediately before use and condemned if defective.

(2) They SHALL be kept well lubricated.

(3) Loads SHALL NOT be placed on points of hooks.

(4) Sheaves should be not less than 6 times the diameter of manila rope and not less than 32 times the diameter of wire rope.

(5) The angle of a sling alters the safe carrying capacity of a load as follows:



## 6.68 GIN POLES

(1) Gin poles SHALL be set perpendicular to or raked slightly toward the load to be lifted so that the pole will not interfere with the load or hoist lines. See Telephone Handbook for erection methods.



ROLLING HITCH

Telephone  
Hdbk.

6.68(2)

6.68 (2) A safety factor of 3 SHALL be used for strength determination of pole, guy cables or braces, hoist lines, and blocks. This means that the load SHALL not exceed one-third of the breaking strength of these items.

(3) A safety factor of 6 SHALL be used as allowance for shock loads when using power-operated hoist or tractor drawbar for lifting loads.

(4) The pole SHALL be straight and free from any serious defects.

(5) Pole length in inches SHALL be less than 60 times its top diameter.

(6) Hoisting tackle and guy lines SHALL be securely attached to pole.

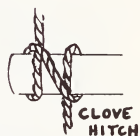
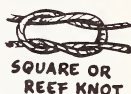
(7) GUY LINES OR BRACES SHALL BE SAFELY ATTACHED TO SUBSTANTIAL ANCHORAGES.

(8) Pole base or sill SHALL be large enough in area to prevent settlement and SHALL be braced against slippage.

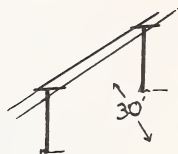
a. A shallow hole 9 inches deep in solid ground will serve as a ground anchorage.

b. The base of the gin pole SHALL be guyed against the winch pull.

(9) A gin pole SHALL NOT be set up or operated under an electric line.



(10) When a gin pole is to be operated in the vicinity of a powerline, extreme care SHALL be used to be sure that the winch line and the guy lines are of such lengths and so positioned that they could not come closer than 30 feet to the powerline in the event of a cable break or a sudden slackening of the guy lines. Remember that a sudden pull on a slackened line may carry the middle of the line to a higher point than it would be when taut.









## 6.7 WELDING

### 6.71 GENERAL

(1) Only competent welders, mechanics, machinists, blacksmiths, or especially qualified men SHALL be allowed to use welding equipment.

(2) Clothing that protects hands, arms, and body SHALL be worn, including nonskid boots and trousers without cuffs. Flameproof gauntlet gloves should be worn.

(3) Welding hoods or goggles SHALL be worn by welders and their helpers. Clear goggles SHALL be worn when preparing the work. See Safety Equipment.

(4) Fire extinguishing equipment SHALL be easily accessible at all times during welding operations



HSC 7.33

(5) All welding SHALL be done in the blacksmith shop, repair shop, in the open, or on a fireproof floor away from combustible materials. There SHALL be no leaks in the hose or connections, and there SHALL be adequate ventilation.

(6) Welding SHALL be done behind a screen if other workers without hoods or goggles are present.

(7) Before cutting into tanks, drums, etc., their contents SHALL



## 6.71(7)

be carefully determined, then they SHALL be:

a. Drained, steam-cleaned, and dried if they show evidence of oil, gasoline, or other highly flammable fluids.

b. Thoroughly dried in the sun.

c. Filled with water up to the point to be welded, with opening left for escape of steam if any is generated during the welding.



(8) When welding brass or zinc-coated metal, job SHALL be done in a draft or wherever air is circulating; or a respirator SHALL be used. The fumes SHALL NOT be breathed.

(9) Whenever welding on metal coated with paint containing lead, respirator SHALL be used.



(10) Sparks and flames SHALL be kept away from cylinders and hose lines.

(11) Hose lines SHALL be inspected frequently. Worn items SHALL be replaced or repaired.

## 6.72 ARC WELDING

(1) All electrical connections SHALL be checked before starting work.

(2) Welding machine SHALL be grounded.

(3) Insulated platform SHALL be used in wet places.

(4) Warning signs should be provided, to prevent eye injuries to observers.

(5) Switch SHALL be turned off when work is stopped. Switch should be provided near at hand.

(6) Insulation and protective coverings SHALL be in safe condition. Only rubber-covered cable, without any splices, SHALL be permitted within 10 feet of the electrode holder.

(7) Cable SHALL be checked often and replaced or repaired if worn.

(8) Cable should be supported overhead, out of the way, off the floor.

(9) Welding leads SHALL be kept clear of the primary leads of electric motor-operated welders.

### 6.73 OXYACETYLENE WELDING

(1) Oxygen or acetylene SHALL NOT be needlessly discharged through the torch before lighting.

(2) Oxygen or other gases SHALL NOT be used where oils or any combustible liquids are present.

- (3) Welder SHALL--
- a. Shut off gases when putting down a welding or cutting torch.
  - b. Avoid excessive pressures.
  - c. Never allow pressure to remain in the hose for long periods or overnight.



6. 73(3)d.

6. 73 (3) d. Protect hose from all sources of damage.

(4) All gauges **SHALL** be checked frequently for accuracy and perfect functioning of valves.

(5) Cylinders **SHALL NOT** be subjected to temperature above 130° F.

## 6. 74 HANDLING OXYGEN AND ACETYLENE EQUIPMENT HSC 8. 34

(1) Acetylene cylinders **SHALL** be used and stored in upright position only.

(2) If transported temporarily in horizontal position, cylinder should remain upright for 2 hours before use.

(3) Oxygen cylinders or apparatus **SHALL NOT** be handled with greasy or oily hands, gloves, or rags.

(4) Valve cap, gauge, coupling threads, hose, or connections **SHALL NOT** be oiled.

(5) Valves **SHALL** be closed, and valve protection cap **SHALL** be in place before moving cylinders.

(6) A cylinder truck or equivalent device **SHALL** be provided to keep cylinders from upsetting while in use or when being moved.

(7) All cylinders **SHALL** be carefully handled to avoid damage and to prevent leaks.



HSC 6. 74(15)



(8) Valve requirements SHALL be--

- a. Open valves on cylinders for an instant before attaching regulators so as to remove any dirt.
- b. Before valves are opened and after attaching regulators to cylinders, release the adjusting screws of regulators.
- c. Open slowly.
- d. If difficult to open, point valve opening away from you and use greater pressure on valve key or wheel.
- e. Do not use wrenches on hand wheel valves.
- f. Open torch valves sufficiently to purge both hoses before lighting the torch, whenever pressure has been cut off in either gas line.
- g. Close cylinder valves and release all gas from regulators before removing regulators from cylinder.
- h. Close valves on all empty cylinders. Replace cap on oxygen cylinder.
- i. When cylinders are not provided with fixed hand-wheel valves, keys or handles SHALL be kept on valve stems while cylinders are in service.

(9) Gas SHALL be taken from cylinders only through regulators and hose intended for and used only for this purpose.

(10) Acetylene SHALL be used only at 15 pounds pressure or less.

(11) Gas leaks SHALL be tested with soapy water only, never with open flame.

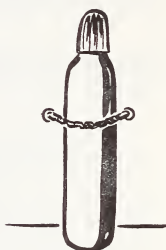
(12) Cylinders SHALL NOT be connected to pipe or manifolds.

(13) Gas SHALL NOT be transferred from one cylinder to another.

6.74(14)

6.74(14) Cylinders of oxygen and acetylene SHALL be stored separately, in a dry place away from stoves, heat, and flammable material, especially oils and greases.

(15) Individual chains or other steadying devices SHALL be provided to keep cylinders in vertical position.



6181.02 Health and Safety Code

# CHAPTER

# 7

## Equipment



Handtools  
Including Power



Machine Equip.



Safety Equip.



## CHAPTER 7. EQUIPMENT

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## 7.1 HANDTOOLS, INCLUDING POWER

### 7.11 GENERAL

(1) These guiding principles SHALL be observed when using tools--

a. The right tool SHALL be selected for the job.

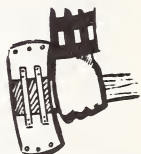
b. It SHALL be in good condition.

c. It SHALL be used correctly, for its intended purpose only.

d. It SHALL be kept in a safe place, both on the job and in storage.



(2) Sharp-edged tools SHALL be guarded or sheathed when carried to and from the job, except in emergencies.



(3) When carrying tools, workers SHALL stay at least 6 feet away from other workers, with tools on the downhill side.

(4) When using handtools, workers SHALL keep at least 10 feet from other workers if possible.

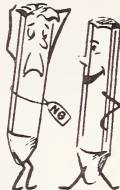


(5) When not in use, tools SHALL be placed against a wall, bank, stump, or laid down in plain sight, with sharp edges down.

(6) Workers SHALL NOT throw tools nor use them in such a way that anyone could be injured.

## 7.11(7)

7.11 (7) Wornout tools, or those needing repair or sharpening, SHALL be segregated from tools ready for use, and adequately signed or locked up to prevent their use.



(8) All tools should be inspected and properly conditioned before use or storage.

(9) Racks and bins for tools SHALL be constructed so that men cannot fall on or collide with sharp edges and so that tools cannot fall out.



## 7.12 TOOLBOXES

(1) Toolbox SHALL have strong, safe handles, and SHALL be designed for safe placing and removal of tools.

(2) Drop lid SHALL be free from rough or broken edges of sheet metal.

(3) Portable box SHALL be limited to size suitable for safe lifting and handling.



(4) Tools SHALL be stored in such a way that handles will not warp.

## 7.13 CHOPPING TOOLS--AXES, ADZES, BRUSH HOOKS, HATCHETS, MACHETES, AND PULASKIS

(1) Maintenance:

a. Tool SHALL be ground to safe bevel. Grind slowly toward cutting edge to preserve temper.

b. Tool SHALL be placed in secure position during filing. Use a hand stone to finish after filing.

c. Axes and hatchets that are excessively round cornered SHALL be condemned.

(2) Use:

a. When carrying unsheathed chopping tool, handle SHALL be grasped close to head, with blade parallel with leg, at arm's length and free from body. Never carry on shoulder. Carry on downhill side.

b. Be sure footing is firm.

c. Always chop away from feet, legs, and body. Stand in such a way that, if tool glances, it cannot strike your feet or legs. If it is necessary to swing toward feet or legs, strike blows lightly so that, if tool glances, you can control it.

d. Employee SHALL--

1. Remove underbrush that might interfere with chopping.

2. Remove overhead branches that tool might hit.

3. Chop only in a natural position where there is sufficient clearance to swing the tool. Never chop crosshanded.

4. Guard against chips hitting the eyes.

5. Use special care when working on hillsides.

6. Watch out for spring when cutting a sapling that is bound down; cut from underneath. Watch for sudden breakage in brittle wood.

7. When standing on logs or springboards, chop only if equipped with nonskid or calked shoes.

e. Chopping tools SHALL NOT be used as wedges or to drive metal wedges or stakes.

f. Two men SHALL NOT chop together on a tree less than 20 inches in diameter.

## 7.13(7)g.

7.13 (7) g. When grubbing with a Pulaski, roots should be cut rather than pulled out.

h. In very cold weather, ax should be warmed before use, if possible, to prevent crystallization and chipping of the blade.



i. When chopping limbs from a felled tree, axman should stand on the opposite side from the limb being chopped, cutting toward the top of the tree.

j. On chopping jobs, special foot and shin protection, such as nonskid, steel-capped shoes and shin guards, should be used.

k. Axmen preparing kindling should keep block or log between stick and feet, or hold stick at sides, never with fingers on top. Belt axes should be used for fine splitting.

l. Feet SHALL NOT be used to hold material being adzed.



## 7.14 CUTTING TOOLS

### (1) HANDSAWS:

a. First cut of handsaw should be made toward you to avoid cutting hand. Guide with thumb placed above teeth of saw.



### (2) BOW SAWS:

a. When inserting a blade in a bow-saw frame, workers SHALL keep hands and fingers in the clear when the tension lever snaps into or against the saw frame.

b. When removing a bow-saw blade from the frame, operator SHALL stay in the clear of the blade.

c. Bow saw SHALL be carried over shoulder, blade to rear.

### (3) CROSSCUT SAWS:

a. When carrying, saw SHALL be placed on shoulder, teeth outward, hand grasping front handle from underneath saw blade, rear handle off. Teeth guards should be used.



b. Logs lying above the ground should be shored up before they are bucked.

c. When cutting logs, watch out for springing.

d. Logs SHALL NOT be bucked from downhill side if there is danger of roll.

e. Wedge SHALL be used as soon as saw binds.



### (4) DRAW KNIVES:

a. Cutting edge SHALL be sharp, and free of nicks, with handles in place.

b. Material being worked SHALL be at working height, firmly anchored and held steady. Draw knife SHALL NOT be used on material being braced by worker's knees.

### (5) FILES:

a. File SHALL have a handle. A knuckle guard should be used for filing against cutting edge.

b. A dull file or one with bent tang SHALL be condemned.

c. File SHALL be kept free of oil or grease. Discard files with hard spots.



### (6) INJECTOR TOOLS

a. The bit SHALL be covered with a shield while not in use (a 1 1/2 x 8" radiator hose makes a good shield).

7.14(6)b.

7.14(6) b. Workmen SHALL keep at least 10 feet apart while working with or carrying the tree injector tool.

c. Only one man SHALL work on a tree.

d. At lunch time and during breaks, injectors SHALL be laid flat on the ground at a central point with bits shielded.

e. Air vents SHALL NOT be loosened enough to cause dripping on the bits.

f. Injector SHOULD NOT be used as a cane or a crutch. This is both dangerous and hard on the bits.

g. Injector SHALL NOT be carried on the shoulders but SHALL be carried by the loop handle on the downhill side with the bit trailing and properly shielded when traveling to and from work area.



h. Injector bit SHOULD be kept sharp. Sharpending should be done with hone. Use a file only when the bit has become gapped or worn.

i. Care SHALL be used in handling chemical mixtures. Wash hands thoroughly with soap and water or use "dry wash" after handling chemicals. Workers SHALL change clothes if they become soiled with chemicals.

j. Safety equipment to be worn by the workmen using the injector tool should include a hard hat, hard-toed shoes, and safety spectacles.

k. Worker SHALL have firm footing and clear all interfering limbs away before using the tool. When treating small trees, the worker should make the thrust carefully to avoid losing his balance or receiving a severe strain if the stem is missed.

l. Care should be taken that worker's hands are only guiding the injector at instant of impact. Let the tree take the jar.

EQUIPMENT

HANDTOOLS INCL. POWER  
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m. Cleaning the chemical from the injector tool should be done with regular motor cleaning "gunk" or filling with water for 48 hours, as needed.

n. Haul injector in tool boxes or special truck racks.

## 7.15 MATERIAL HANDLING TOOLS

### (1) BARS

a. Fulcrums and toeholds SHALL be secure, to avoid mashed fingers and toes.

b. When prying, operator SHALL grasp bar to place it, then push with his palms, Foot or other part of body SHALL be kept out of line with bar.

c. Bar SHALL be laid flat and in the clear when not in use on the job, such as along side materials or at foot of a wall except in desert country where bars heat up.

d. Bent or twisted bars SHALL be discarded.

e. When applying leverages, worker's body SHALL be kept out of danger in case the pry blocks, or load should slip.



### (2) CHOPPING TOOLS--GRUB HOES, MAT-TOCKS, AND PICKS

a. Blade eye SHALL be tight fitting and wedged so that it cannot slide down handle.

b. Workers SHALL spread feet, get secure footing, and grip, then they SHALL keep legs and feet in the clear when swinging.

c. Loose handled tools SHALL be repaired promptly or replaced.



### (3) HAND TRUCKS:

a. Load SHALL be no higher than one can see over.



7.15(3)b.

7.15(3) b. Load SHALL be secure and well balanced.

c. Operator SHALL -

1. Keep feet away from wheels.

2. Keep fingers where they cannot be crushed.

3. Push truck instead of pull it, if possible.

4. Slow down at blind corners and intersections.

5. Place truck clear of passageways when not in use.



(4) JACKS:

a. Jack SHALL be inspected for safe capacity and condition of screws, lift, and safety pawl.

b. Both ends SHALL be examined to make sure they are not bent over or rounded.

c. Jack SHALL be set on solid footing.

d. Load SHALL be centered on jack to prevent load from tipping.

e. LOAD SHALL BE BLOCKED UP BEFORE WORKER GETS UNDER AN OBJECT SUPPORTED BY JACKS.



(5) PIKE POLES:

a. Point SHALL be kept sharp.

b. Keep body balanced when pushing the pole.

c. There should be guards on points when not in use or when being transported.

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(6) SHOVELS:

- a. Shovel should be kept sharp.
- b. It should not be used as a pry bar.
- c. Legs should be used as fulcrum.

(7) WEDGES:

- a. Steel wedge SHALL be checked for cracks and flaws.
- b. It SHALL be properly pointed and tempered, with a 3/16-inch bevel ground around the head.
- c. Temper of wedge SHALL be a little softer than that of the sledge being used.
- d. Heavy wedge should not be carried in pocket.
- e. All mushroomed heads SHALL be reconditioned before use.
- f. Only wood, magnesium, or soft metal wedges SHALL be used with power saws.



(8) WHEELBARROWS:

- a. Workers SHALL--
  1. Keep back straight and use legs when lifting handles of loaded wheelbarrows.
  2. Keep load evenly balanced, with weight well forward to avoid lifting and strain. Push, don't pull it.
  3. Walk, don't run with a wheelbarrow.
  4. Provide enough clearance so knuckles will not get bruised or skinned.

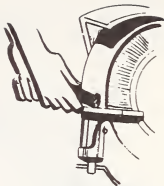


7. 16 STRIKING TOOLS--CHISELS, HAMMERS, MAULS, AND SLEDGES

- (1) Wood-handled chisel should be protected with a leather band on the striking end. Wooden or rubber maul should be used.

## 7.16(2)

7.16 (2) Head of cold chisel SHALL be ground with a slight radius at first sign of burring or mushrooming.



(3) Nails being driven should be held just under the head and not at the base.

HSC 7.33

(4) When driving a large bar or other object, other worker SHALL hold it with tongs or holder rather than with his hands. See Goggles.



(5) A maul SHALL be harder tempered than the wedge, bar, or drill steel to be struck.

(6) When striking, your eyes SHALL be kept on the head of the object being struck. Other workers not using sledge SHALL be at safe distance or they SHALL turn their backs.

## 7.17 TORSION TOOLS

### (1) SCREWDRIVERS:

- a. An awl, auger, drill, boring kit, or driven nail should be used for starting a screw.
- b. All parts of the body SHALL be kept in the clear in case screwdriver slips.
- c. Screwdriver should be right size for screw slot.
- d. Screwdriver with insulated handles SHALL be used for electrical work.



### (2) WRENCHES:

- a. Wrench SHALL be applied to the nut so the wrench handle will turn in the direction in which the jaws point. Face jaws of adjustable wrench in direction of pull.

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b. Worker SHALL get firm grip on the work before he pulls hard; then pull toward himself and at right angles to the wrench.

c. A piece of pipe SHALL NOT be used to increase leverage, nor SHALL a wrench be used as a hammer.

d. Wrench SHALL NOT be used on material or machine in motion.

e. Pipe wrenches SHALL be used only on round surfaces.



## 7.18 POWER-ACTIVATED HANDTOOLS

### (1) AIR TOOLS:

a. Operators SHALL wear protective equipment specified for the job.

b. On all air tools on which a replaceable bit or jack set is not retained by a fixture on the tool, a loop of annealed wire SHALL be run around the collar of the bit or jack set, and fastened to the handle of the tool.

c. Hammers SHALL be equipped with safety tool retainers to prevent tools flying from sockets.

d. Tool retainers SHALL be inspected daily for cracks due to vibration.

e. To avoid hazards of flying particles or whipping of air hose, pressure SHALL be released before connections are broken. Air hose SHALL never be kinked to cut off pressure.

f. Operator SHALL be sure that no nearby workers are in line of air flow. Never under any circumstances SHALL an air hose be aimed at anyone.

g. If the tool becomes detached from the air hose under pressure, operator SHALL NOT try to grasp the hose and kink it. The air SHALL be turned off at the base control valve.

h. Control valve SHALL be closed before air is turned on and SHALL be kept closed until hammer is ready to use.

7.18(1)i.

7.18(1) i. Air SHALL NOT be used to blow dust or chips from hair or clothing.

j. Line oilers SHALL be placed so that oil cannot drain back into the air tank.

k. When using wagon drill, operator SHALL--

1. Always run tool down when changing angle of drill.

2. Secure wheels and dogs of the wagon drill before starting drill.

3. Stand out of line of a hole that is being airblown.

1. Extra precautions SHALL be observed in hillside or sloping rock drilling, especially when starting the hole. Temporary scaffolding or other device to give the operator secure footing is important. Footwear SHALL be nonskid. Operator SHALL stand far enough away from tool so that he cannot be injured if it slips.

m. Operator SHALL--

1. Be especially careful when laying air hammer down so that trigger cannot be operated accidentally.

2. Loosen tool by rocking back and forth instead of trying to pull it out if it sticks.

3. Never leave hammer standing when not in use.

HSC 7.33, 7.34,

n. See Goggles, Hard Hats, Respirators and Compressors.

7.37 & 8.55

## (2) ELECTRIC TOOLS:

a. Only tools that are supplied with a three-wire cord should be used with the third wire completing the grounding of the tool through the use of a three-way plug, or a ground wire equipped with a grounding clip attached to an effective ground, such as a water pipe.

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b. Tool operators SHALL--

1. Use electrical hand tools in accordance with manufacturer's instructions.

2. Use color code to mark points on tool that are dangerous.

3. Hold firmly or clamp material to be drilled, sanded or routed to a fixed object.

4. Use quick release trigger switches on electrical skillsaws and drills.

5. Keep guard adjusted on skill saws.

6. Guard cords from becoming entangled, damaged or cut by blades and bits.

7. Keep work area orderly and clear of debris.



(3) POWER SAWS

a. The manufacturer's operating and safety instructions SHALL be followed unless modified in writing by the supervising office.

b. When carrying saw, the motor SHALL ordinarily be stopped. When making several bucking cuts on a felled tree or when limbing a felled tree on moderate ground, the saw need not be stopped between cuts. The blade SHALL NOT be turning and the hand SHALL be off the gas lever. One man SHALL carry one-man saw at side with blade to rear; two men SHALL carry two-man saw at side or between them. Tool SHALL be placed in vehicle so it cannot shift in transit. Saw blade should be guarded.

c. Before motor is refueled, it SHALL be cooled for 5 minutes. The fuel tank should be filled on bare ground and spilled fuel SHALL be wiped off motor. The saw SHALL be started at least 10 feet away from fueling area. Only approved safety fuel containers SHALL be used.

Fill on bare ground



7.18(3)d.

7.18(3) d. When starting saw, operator SHALL get good footing, place saw on level ground, put chain out of gear, hold saw with one hand, and pull starting cord away from body, being careful not to wrap cord around hand.



e. Motor SHALL be stopped for all cleaning, adjustments, and repairs to saw or motor.

f. Motor SHALL be started and operated only when all workers are clear of the saw.

g. Wood, magnesium, or soft metal wedges SHALL be used.

h. See Tree Felling. HSC 5.22

i. See Back Pack Power Units. HSC 7.18(4)

(4) BACK PACK POWER UNITS (Girdling, pruning, planting, clearing, etc.)

a. Manufacturer's operating safety instructions SHALL be followed unless modified in writing by supervising officer.

b. Two-man teams should be used to place power units on operator's shoulders, change attachments and for starting motor. Both men should be trained operators and exchange places every hour or less depending on fatigue factor. The second and additional helpers (if needed) clear limbs, prepare access, dispose of cut material to provide a safe operating area.



c. The foreman or crew boss will be responsible for establishing work rules providing that none of the helpers will be within ten feet of the cutting head except on a pre-arranged signal from the operator.

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d. The cutting bar and control lever SHALL be held firmly and handled carefully at all times while the power unit is running to prevent accidental acceleration due to catching on brush or other obstructions.

e. Each attachment for the power unit SHALL be equipped with a quick shut-off switch and/or an automatic clutch that will disengage the power in the event the cutting-head is pinched or jammed.

f. The operator SHALL keep the cutting head under observation at all times while unit is running to be sure others are in the clear and to avoid damage to the unit.

g. Before motor is refueled, it SHALL be cooled for at least five minutes. Fueling should be done on bare ground and spilled fuel SHALL be wiped off the motor. Starting SHALL be done 10 feet from refueling point.

h. Motor SHALL be stopped for making repairs or adjustments either to the motor or cutting attachment.

i. Safety equipment to be worn by operator: hard hat, hard-toed shoes, safety goggles or plastic shields, tight fitting clothing not subject to entanglement in any of the working parts and special equipment needed for the specific project. Care SHALL be taken to keep clothing free of fuel.

j. Maintain a balanced stance while operating.

k. The operator SHALL NOT move from operation to operation with the attachment turning.







## 7.2 MACHINE EQUIPMENT

### 7.21 A. GENERAL

(1) NOBODY SHALL BE	HSC 7.3
DIRECTLY IN FRONT OR BACK OF A	8.5
SELF-PROPELLED MACHINE BEING	3.3
STARTED BY ANOTHER.	6.6

(2) Employees SHALL--

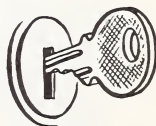
a. Never go under or in dangerous places around equipment without notifying the operator and being on the lookout for hazards.

b. Never get on or off moving equipment.

(3) Equipment operators and	HSC 1.14(10)
workmen SHALL operate or work with	
only that equipment to which they have been assigned.	

(4) Ample clearance SHALL be provided for a man between any solid material and the tail swing of a dragline, shovel, or crane.

(5) Hazards SHALL be investigated and corrected before machines are moved into operating positions. Machines SHALL be located or operated where operators SHALL NOT be endangered by blasts, cave-ins, or other hazards. Operators SHALL move machines into blasting area only after being instructed to do so by the foreman or blaster in charge.



CAB KEY  
AT "OFF" !

(6) All engines SHALL be	HSC 3.31(5)
stopped before refueling.	

EQUIPMENT

MACHINE

(7) When filling a gasoline tank, the nozzle, funnel, or container SHALL be kept in contact with the gasoline tank, to avoid the possibility of a static spark igniting the gas.

(8) Heavy-equipment operator should have a helper to assist with work when necessary.

(9) When changing operators, the man in charge SHALL discuss with the new operator and the crew the plan of work, the existing hazards, the hand signals, and other safety features of the job.

(10) Any machine with parts that are lowered by gravity, such as shovels, buckets, bulldozer blades, and skip loaders, SHALL be left only with the movable part resting on the ground.

(11) Fire extinguishers SHALL be provided where machine hazards warrant them, such as temporary fuel dumps, asphalt distributors, etc.

(12) Defensive operations SHALL be practiced all the time. This means operator of machine equipment of all types SHALL:

a. Understand the operating limitations of the equipment and operate within those limitations at all times.

b. Avoid doubtful or spectacular operations.

c. Avoid abnormal accident situations created by ground, weather or fire conditions.

d. Accept competent advice.

HSC 3.31(8)



HSC 2.11



## B. INSPECTION

(1) WHEN MACHINERY OR EQUIPMENT (INCLUDING THAT UNDER CONTRACT) IS RECEIVED, REMODELED, OR REPAIRED, IT SHALL BE INSPECTED FOR SAFE OPERATING CONDITION BY A QUALIFIED PERSON BEFORE IT IS TURNED OVER TO THE OPERATOR.

(2) Operator SHALL currently inspect his machine for safe operating condition and promptly notify his superior officer of needed repairs.



(3) Where safety of operator, HSC 7.21B(1) crew, or equipment is concerned, defective machinery SHALL be shut down until repairs are made. Before it is placed back in service, it SHALL be inspected.

## C. GUARDS AND SAFETY DEVICES

(1) All gears, sprockets, drive belts, chains, pulleys, drums, gears, fans, or other hazardous moving parts SHALL be provided with guards where practical to do so.

(2) Guards SHALL NOT be removed or made ineffective except while making repairs.

(3) Power for the machine SHALL be shut off until repairs are made and guards replaced.

(4) Sawmills SHALL be provided with guards for belts, saw, and carriage.

(5) Operating platforms surfaced with non-skid material, footwalks, ladders, steps, handholds, guardrails, and toeboards necessary for safe operations SHALL be installed before operating the machine.

(6) Adequate protection for operators SHALL be provided to guard against falling or protruding objects, swinging loads, winch cables rolling over and related hazards.



(7) Safety glass or expanded steel mesh shields SHALL be used in cabs, or enclosures on machines.



(8) MOTOR SHALL NOT BE OPERATED UNLESS ONE WINDOW IS COMPLETELY OPEN.

(9) Motors with known or suspected defective exhaust system SHALL NOT be used to furnish heat under any circumstances.

#### D. SIGNALING

(1) A competent signalman SHALL be posted at dangerous or congested points, near crews or blind areas.



(2) Only one man SHALL give signals.

(3) The right use of hand signals SHALL be observed. Make sure that signals and instructions are clearly understood.

(4) Signalman SHALL get as close to operator as safety permits so operator can clearly see movements of signals.

(5) All signal motions SHALL be big so that operator can understand signals. Repeat frequently.

(6) When slow pull or easy move is wanted, signal motions SHALL be made at slow tempo; signal motions SHALL be faster for fast pulls or moves.

(7) These signals SHALL be observed when directing vehicular or construction equipment, except when standard industrial specialized signals are agreed upon and understood in advance:

See Fireman's  
Guide - Page 208

for Fire Tractor Signal

a. Move Forward: Pull motion, one hand.



**MOVE FORWARD**

b. Move Backward: Push motion, one hand.



**MOVE BACKWARD**

c. Turn Around: Circle one hand above head.



**TURN AROUND**

d. Slack Up: One arm in front, hand moving up and down.



**SLACK UP  
MACHINE**

e. Raise: Raise one hand  
palm up.



**RAISE**

f. Lower: Lower one hand,  
palm down.



**LOWER**

g. Stop: One arm raised,  
palm forward.



**STOP**

## E. TRANSPORTATION

(1) Before heavy machinery is moved, route of travel SHALL be checked for hazards, such as overhead and side clearance, culverts and bridges, and overhead high-tension lines.

(2) Operator SHALL know load weight, width, and height; obtain state permit; comply with the state requirements of flagging and signaling.

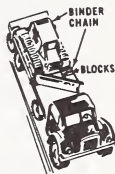


EQUIPMENT

MACHINE

(3) Before heavy equipment is hauled on a truck with false bed, the false bed SHALL be removed or securely bolted to truck bed to prevent slipping on steep hills.

(4) Heavy equipment SHALL be blocked sidewise and lengthwise on truck beds. It SHALL be securely bound to the truck both front and rear or on each side, with chain or cable and tightened with load binders.



(5) Tractor blades SHALL be angled, removed, or a special permit secured as necessary to comply with State laws pertaining to width of clearance.

(6) Loose tires, planks, or other heavy material SHALL NOT be left in the path of moving equipment.

(7) Traffic plates, planks, or other loose items on trucks or transports SHALL be crated or blocked to prevent movement and securely bound to the bed with chain or cable tightened by load binders.

(8) See Car Travel

HSC 2.1

## 7.22 TRACTORS

### A. GENERAL

(1) INJURIES FROM TRACTOR OPERATIONS ARE USUALLY VERY SERIOUS, OFTEN FATAL. DEFENSIVE OPERATION SHALL BE PRACTICED AT ALL TIMES.

HSC 7.21A

(2) Only qualified operators SHALL be allowed to drive.

a. Apprentices SHALL operate a tractor only under the immediate supervision of a skilled operator.

b. No one except a trainee or mechanic engaged in actual repair SHALL be permitted to ride on the seat with the operator, and then only if the slope is less than 30 percent, except when essential in fire emergencies.



(3) Hand holds should be installed on seat frame, fuel tank frame, or hydraulic-jack assembly, to assist driver in mounting and dismounting.

(4) Adequate canopies, bars or heavy wire screens SHALL be installed on all tractors operating outside of cleared areas to protect the operator from the top, sides, front and back against hazards due to cover or moving parts mounted on the tractor such as a rear mounted towing winch.



(5) Operator SHALL know whereabouts of all people nearby. When tractor is in motion, helpers SHALL remain in plain sight at least 50 feet to the side whenever possible. If there is danger from snags or defective trees, helpers should be at least 1 1/2 times the height of the tallest trees from the tractor.

EQUIPMENT

MACHINE



(6) Tractor SHALL NOT be operated if any part of the control, hoist, or hydraulic system, including steering and brakes, is not in safe operating condition. Foreman or mechanic SHALL be advised if tractor is unsafe.

(7) Before starting the engine, transmission SHALL be in neutral, master clutch disengaged, and blade down.

(8) All workmen SHALL keep clear of a tractor in motion. To stop operator, signal from a safe distance.

(9) When motion is stopped and engine is idling, the transmission SHALL be in neutral and the master clutch engaged, so tractor cannot be jarred into motion.

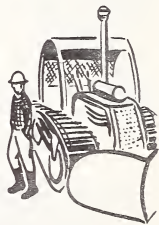
## B. DRIVING

(1) The master clutch SHALL be engaged gently, especially when going up a hill, across a side slope, or pulling out of a ditch.

(2) Operator SHALL--  
a. LOOK OVER THE GROUND TO BE TRAVELED AND JOB TO BE DONE. WHERE IT CANNOT BE CLEARLY SEEN FROM THE DRIVER'S SEAT, HE SHALL DISMOUNT AND EXAMINE IT BEFORE PROCEEDING, UNLESS HE HAS A SPOTTER TO GUIDE HIM. AVOID SETUPS FOR UPSETS.

b. Be extra careful around overhanging rocks, on rock slides, and near dead trees.

c. USE EXTREME CAUTION IN GOING OVER OBSTACLES WHEN HEADED DOWNHILL.



7.22B.(2)c.

THE DRIVER SHALL BE SURE THE SLOPE IS SAFE AND SHALL DRIVE CAREFULLY.

d. OBSERVE AND COMPLY WITH SAFE LIMITS OF TRACTOR OPERATION ON SIDE SLOPES, REMEMBERING THAT WHEEL TYPE TRACTORS OVERTURN EASILY.

e. Reduce speed before making a turn or applying brakes. If the speed of a tractor is doubled, the danger of overturning is increased four times.

(3) When on steep side slopes operator SHALL--

a. Guard against running over rocks with upper track or wheels.

b. Keep off solid rock faces.

(4) The transmission SHALL be in gear when tractor is going down steep grades.

(5) If tractor slides sideways, usually uphill track should be locked and the machine turned immediately.

(6) Turns SHALL be made so that operator is on uphill side if possible.

(7) When the towing winch is in operation, hands SHALL be kept free from the cable and working parts.

(8) Dozer blade SHALL be lowed whenever operator dismounts.

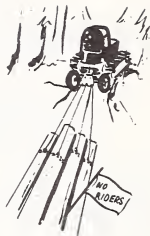
### C. HITCHING AND TOWING (TRACTORS)

(1) A bar or stick SHALL be used to steer coupling bar into drawbar jaws.

EQUIPMENT

MACHINE

(2) Nobody SHALL be allowed to ride on the drawbar, bulldozer blade, frame, or materials or equipment being pulled, unless his presence is necessary for operation of the unit and a seat is provided thereon. Dragged logs, roots, stumps, rocks, or other similar material SHALL NOT be ridden.



(3) Operator SHALL look behind before backing up to slack the chain or cable. Slack in the chain or cable SHALL NOT be taken up with a jerk.

(4) When hooking towline to the front pull hook, the blade SHALL be rested on the ground or on a block or rock before worker SHALL climb over the blade to attach the line.

(5) Hookers and groundmen SHALL stand clear of all chains and lines and SHALL stay away from the tractor, at least the length of the towline.

(6) For work near any electric powerline, the length of cable attached to the load SHALL be at least 10 feet shorter than the distance from the tractor to the powerline, so that it cannot strike the line.



(7) Tractor SHALL be operated so that it does not nose up or tip when pulling a heavy load upgrade or slide sideways when pulling around a side hill.

(8) Tractor SHALL be stopped out of gear and the brake set before the load is released.

## 7.22C.(9)

(9) When skidding with a tractor--

a. Each morning and after each hard haul, tractor operator and choker setter SHALL inspect equipment, including rope and eye splices on winch, choker eye splices, and ferrules.

b. After chokers are set, choker setter SHALL get out of danger where he can see the operator, and vice versa, at all times. Both SHALL watch for falling trees and limbs and warn each other of dangers.

c. Choker setter SHALL stay at least 20 feet behind the load.

### D. TRACTOR ADJUSTMENTS

(1) Towing winch SHALL be adjusted only when the motor is stopped. For adjustments requiring the motor to be in operation, the transmission SHALL be in neutral and the master clutch SHALL be engaged. Front mounted power control unit SHALL be adjusted only when the motor is stopped.

(2) Before working on the towing winch, the dozer moldboard and the scraper bowl SHALL be lowered to the ground.

(3) No one SHALL get under an unblocked, raised blade for any purpose.

### E. SCRAPERS, CARRYALL



(1) When changing the cutting edges or working underneath the scraper, the bowl SHALL be blocked up to prevent it from dropping.

(2) Blocks SHALL be placed between the apron arms and scraper side before work is done under the apron.

EQUIPMENT

MACHINE

(3) Hands SHALL be kept free from the cable, sheaves, and linkage while the unit is in operation.

(4) Leather-faced gloves SHALL be worn when handling cable.

(5) When traveling down a steep hill, operator SHALL be ready to drop the cutting edge to the ground to serve as a break if the scraper should start to jackknife or get out of control.

(6) Weak or frayed cable SHALL be replaced immediately.



#### F. TIMBER OPERATIONS

(1) TRACTORS AND BULL-DOZERS USED IN DANGEROUS, TIMBERED COUNTRY OR IN PLACES WHERE THERE IS DANGER OF FALLING OBJECTS SHALL BE EQUIPPED WITH CANOPIES OR ROLLOVER BARS WHICH WILL PROTECT THE DRIVER.

(2) BEFORE OPERATING ALONE, DOZER OPERATORS SHALL BE THOROUGHLY INSTRUCTED IN THE SKILLS OF PUSHING OVER TREES.

(3) OPERATORS SHALL LOOK OVER THEIR AREAS FOR HAZARDS SUCH AS DANGEROUS SNAGS, TREES UPROOTED WHILE PILING BRUSH, ETC.

#### G. TERRACING OPERATIONS

(1) Only fully qualified mountain operators SHALL be assigned. Apprentice or trainee operators

HSC 7.22A



## 7.22G.(1)

SHALL NOT be allowed to operate a tractor on terracing work.

(2) When two or more tractors are working on a project, their operations SHALL be so organized that one SHALL NOT be working directly below another.

(3) A safety scout SHALL be provided where ground visibility is poor because of dense bush or weeds. Work areas should be checked for loose logs, rocks, stumps, bedrock outcropping, and similar hazards. Hazards will be removed or identified before work begins.



(4) Heel trenching with lower corner of blade SHALL be limited to slopes not exceeding 35 percent.

(5) In moving downhill from one terrace to another, the operator SHALL lower the dozer blade and back the tractor downhill.

(6) If the slope is steeper than 65 percent, the operator SHALL build a road from one terrace to another.

(7) The safe maximum slope on which most tractors should be operated is 45%. To work on a maximum slope, the operator must be aware of factors that effect control such as speed, roughness of terrain, tractor attachments and type of soil. Other factors effecting stability and control on slopes:

a. Track slippage due to excessive loads causing downhill track to "dig in".

b. Height of hitch on the tractor. A high mounted drawbar gives the tractor less stability.

EQUIPMENT

MACHINE

c. Wide track shoes tend to decrease "digging in" and provide more stability.

d. Jerking of steering or master clutches make the tractor less stable.

(8) Tractor operations SHALL be suspended after storms until good traction is assured.

#### 7.23 END LOADERS--TIP OVER EASILY BECAUSE OF HIGH CENTER OF GRAVITY.

(1) Only the operator and his apprentice SHALL ride on seat of vehicle, and then only when supervised by a competent foreman.

(2) Operator SHALL be sure wheels or tracks are on firm ground.

(3) Load SHALL be picked up under center of its weight if possible.

(4) Machine SHALL NOT be moved until safely loaded.

(5) It SHALL be started and stopped slowly when raising, lowering, and traveling.



#### 7.24 GRADERS--MOTOR OR PULL TYPE

##### A. GENERAL

(1) OPERATORS SHALL BE ALERT TO DANGER FROM FATIGUE DUE TO MONOTONY OF THE JOB.

(2) Foremen SHALL allow only competent operators to drive. Beginners SHALL operate only under the immediate supervision of a skilled operator.



7.24A.(3)

(3) Machine SHALL NOT be backed until operator is sure that there are no hazards. Rearview mirror SHALL be used.

(4) The end of the blade that is on the traffic side should be pointed to the rear and away from the direction of travel when possible.

(5) Get on and off a grader only when it is stopped.

## B. PUBLIC PROTECTION

(1) "Men and Equipment Working" signs or red flags SHALL be posted on road section being worked if traffic warrants this, to warn and protect forest users.



(2) When graders are moved over public roads--

a. State requirements as to lights, brakes, licenses, etc. SHALL be observed.

b. It is safer if the back side of the mold-board is facing ahead.

c. The moldboard SHALL be angled enough so that both ends are within the width limits of the tires.

d. Red flags or flashing yellow lights SHALL be mounted on the left front and rear or top of cab of all operating vehicles.

e. On narrow roads operator SHALL stop to let oncoming traffic pass.

(3) Blading should be so planned that the blading on each section will be completed each day. Where a wind row must be left overnight, warning signs or lights SHALL be placed to warn motorists.

EQUIPMENT

MACHINE



## C. OPERATION

(1) ONLY THE OPERATOR SHALL BE ALLOWED ON THE MACHINE WHEN IN MOTION.

Exceptions:

a. When operator is instructing a trainee.

b. Foreman may ride to direct work on fine finishing of bank slopes or close grading.

(2) Operators SHALL--

a. Keep cab ventilated to avoid effects of exhaust fumes. Exhaust tailpipe should be set at an angle of 45° to right or left of line of travel.

b. Adjust levers or controls direct. Never reach through steering wheel to do it.

c. Watch the road for hazards. Dismount and look things over carefully if you cannot see clearly.

d. Pull rather than push logs and windfalls out of the road where there is danger of them sliding or rolling on the machine.

e. ALWAYS TRAVEL AT A SAFE SPEED REGULATED TO ROAD AND WEATHER CONDITIONS.

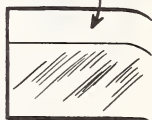
f. Grade slowly enough to prevent the machine or yourself from being thrown out of control if it strikes roots, rocks, or stumps.

g. Only on rare occasions operate the grader on any work at speeds exceeding 5 or 6 miles per hour.

h. Be sure all of the crew is in full view before starting and that men do not get too close to machine when in motion.

i. Shift into lowest gear necessary to climb or descend a grade.

OPEN WINDOW



## 7.24C.(2)j.

7.24 C. (2) j. Maintain control on hills by keeping machine in gear; never coast out of gear. Do not depend entirely on brakes to hold grader while traveling, working, or when parked.

k. Keep graders away from edge of road on fills with soft shoulders.

l. In bank sloping, watch above the cut for rocks, logs, and trees that may roll when loosened by the blade action.

m. When turning a patrol grader, point the front wheels toward the fill shoulder.

n. When backing up older machines remember that brakes do not hold as well in reverse as when going forward.

## D. MAINTENANCE

(1) Motor SHALL be stopped, HSC 3.31(5) and can or pump nozzle SHALL touch the intake when filling fuel tank.

(2) Before working on the machine, employee SHALL set brakes, drop blade, stop motor.

(3) Before checking the blade bolts, follow (2) above and put block under blade.

(4) Oil leakages on cab floors SHALL be corrected and floors cleaned before operating.

## 7.25 SHOVELS AND CRANES

### A. PLACEMENT

(1) If machine is placed near an excavation, shoring and bracing SHALL be installed to prevent a cave-in. Otherwise machine SHALL be kept back from the edge, a distance at least equal to depth of excavation.



EQUIPMENT

MACHINE

(2) Machine SHALL be placed on as level ground as possible. If necessary to use cribbing or shims to level it, be sure they are sturdy and will not overturn or shift. The machine SHALL be well blocked to prevent roll or sinking after being placed in position.

(3) When operating a pneumatic-tired self-propelled machine, outriggers SHALL be used to stabilize the unit when necessary.

## B. OPERATIONS

(1) A shovel or crane SHALL be operated only by a qualified operator. Exception: An apprentice SHALL perform operations only under the direction of an experienced operator.

(2) Operator SHALL--

a. WEAR CLOSE-FITTING CLOTHING LIKE COVERALLS, AND NONSKID SHOES.

b. Permit only mechanic, inspector, or apprentice operator in cab while machine is in operation.

c. Give signal and wait until everyone is in the clear before hoisting materials.



(3) Operator SHALL hoist only those loads well within the rated crane capacity. When lifting heavy loads, a 2-, 3-, or 4-part line SHALL be used to keep within the rated capacity of the hoisting cable. A data sheet showing operating ranges and capacity ratings with boom at various angles should be posted in the cab.



7.25B. (4)

7.25 B. (4) Booms and cables SHALL NOT be overloaded.

(5) The distance between operations and live high-tension lines SHALL be 1 1/2 times the length of the boom plus the length of the material being carried. This does not apply when power has been cut off. Where booms operate near live lines they should be equipped with a "Safe-T-Boom."



HSC 8.24(3)

(6) If boom should come in contact with overhead wires carrying electrical current, operator SHALL--

a. Stay on machine until boom is cleared or current is cut off.

b. Keep everyone on the ground away from the machine.

c. Jump clear, if it is necessary leave the machine, without touching it and ground at same time. Do not step off.

(7) Hands SHALL be kept clear of moving cables and other moving parts.

(8) All slings, ties, and hooks SHALL be safely placed and secured before material is hoisted.

(9) EVERYONE SHALL BE KEPT AWAY FROM DIPPER, BOOM, OR LOAD BEING OPERATED OR MOVED. HANDLINES SHOULD BE USED FOR GUIDING LONG MATERIALS.

(10) Men SHALL NOT go under raised dipper or boom.



EQUIPMENT

MACHINE

(11) Men SHALL be kept away from tail swing.

(12) Trucks SHALL be loaded only when they are safely placed and the driver is out of the cab and in the clear.

(13) Load SHALL be swung over rear of truck and not over cab, when possible.

(14) Machine SHALL be mounted only when it is not moving.

(15) Everyone SHALL be in the clear before machine is backed up or moved.

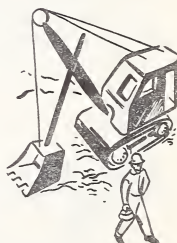
(16) The master clutch SHALL be disengaged before leaving the cab temporarily.

(17) Power SHALL be shut off, controls locked, and movable parts secured before leaving the cab for the day.

(18) The dipper or other load SHALL rest on the ground before leaving the cab. Never leave it suspended.

### C. MAINTENANCE

(1) All cleaning, greasing, oiling, and repairing SHALL be done with the engine turned off, if possible, and with all movable parts secure. If necessary to leave the engine running, the master clutch SHALL be disengaged, and a "DO NOT OPERATE" sign SHALL be put near the controls.



## 7.25C.(2)

7.25 C. (2) Leaking feed lines and fuel tanks SHALL be repaired promptly.

(3) Machine SHALL be maintained in safe operating condition, including the controls, cable, and brake system.

(4) Iron floor plates, walkways, and ladder used for oiling or making repairs SHALL be kept in safe condition and free of ice, mud, oil, or grease.

(5) Cables SHALL be inspected each day for raveling or breaks. Cable clamps SHALL be kept tight and free of slippage.

### D. TRANSPORTING

(1) Boom SHALL be lowered so that tip is no higher than the cab, if feasible. If machine is provided with a cradle or rack for supporting boom, it SHALL be used.

(2) A flagman SHALL be used when there are hazards to the operator or other persons.

(3) Operator SHALL watch for overhead obstructions, such as underpasses, low-hanging limbs, or wires.



(4) Free rolling or coasting with traveling gear disengaged SHALL NOT be done.

## 7.26 CRUSHERS

### A. GENERAL

(1) Crusher operation SHALL be permitted only under the supervision of a qualified employee whose only duty is plant supervision.

EQUIPMENT

MACHINE

(2) A safety operating plan SHALL be made, posted, and maintained at the crusher.

## B. CONSTRUCTION

(1) Safety switch or remote control to the switch SHALL be provided for stopping motor in an emergency. It SHALL be placed preferably near the chute to crusher jaw.

(2) All walkways, ladders, and guards SHALL be constructed of sound materials and completed before the plant is operated.

(3) Feed platform SHALL be level and surfaced with nonskid material, such as rough lumber.

(4) Periodic inspection SHALL be made of all construction, for evidence of possible structural failures.

## C. OPERATION

(1) When operating crusher from platform above, crusher opening SHALL be provided with a guard large enough for entrance of rock of crusher size but small enough to give protection against workers falling into the opening.



(2) A rock hook SHALL be used to feed, turn, or remove rock from the crusher.

(3) When belts are removed or replaced, power SHALL be shut off.

(4) Machinery SHALL be motionless before it is cleaned, serviced, or repaired.



## 7.26C.(5)

### 7.26 C. (5) In portable crusher operations--

a. Power SHALL be stopped before obstructions are removed.

b. Employees SHALL NOT stand on or close to the flexible power drive mechanism.

## 7.27 CHIPPERS

### (1) GENERAL

a. The project chipper foreman SHALL have responsibility for safety on the entire operation.

b. Long-sleeved shirts and wristlet-type gloves SHALL be worn at all times by those feeding machines.

c. The chipper operator SHALL wear eye protection (safety-type goggles or shield) at all times during chipper operation. HSC 7.33

d. Motors SHALL be stopped before making adjustments or repairs on chippers or conveyors. Engine tune-ups SHALL be made with the engine clutch disengaged.

e. Cutter blade bolts SHALL be checked before the machine is started in the morning and at noon.

f. When adjusting blades, cover sharp blade below one being adjusted with section of split hose, because space and tools are too small to safely use gloves.

g. Pitch and sawdust accumulations SHALL be thoroughly cleaned from seating surfaces of cutterhead and wedge blocks when blades are being changed.

h. Wedge bolts and adjusting bolts SHALL be tightened in accordance with the manufacturer's specifications. They SHALL be rechecked before the machine is started in the morning and at noon.

EQUIPMENT

MACHINE



i. After blades are changed and adjusted, the cutter knife SHALL be rotated once by hand to make sure that all blades clear the knife bed.

j. After a blade change, the crew SHALL stand well back from the machine while the operator brings the cutter head to operating speed.

k. The operator SHALL NOT allow anyone to stand directly in front of the exhaust chute while the cutterhead is in motion.

## (2) Brush Chipper

a. Not more than two men SHALL feed the chipper. If necessary to stand closer than 6 feet from the hopper, only one man SHALL feed it, and he should do so from the side. No one SHALL reach in throat of operating chipper.

b. Only limbs between 2 feet and 6 feet in length should be chipped. Dry and excessively crooked pieces should be left out. Short pieces SHALL be fed into the chipper with a longer piece.

c. Material SHALL be thrown into the hopper butt end first.

d. A pusher stick or another limb SHALL be used to clear the hopper.

e. Diameter of limbs to be chipped is governed by the size of chipper being used. Operator SHALL NOT overload it.



## (3) Tree Chippers

a. The chipper operator SHALL NOT permit anyone to climb on or enter the conveyor while it is in motion. No one SHALL be permitted in the conveyor when the main chipper engine is running.

b. A pike pole, hook, or other suitable device SHALL be used to dislodge limbs which become hung up in the conveyor mechanism.

c. The chipper blower discharge should be down wind when possible.

7.27(3)d.

7.27 (3) d. The chipper operator SHALL be sure that the discharge area is clear before the blower is started.

e. Crew movements on the blower side SHALL be limited to an area 6 feet wide paralleling the machine.

f. The chipper bonnet (hood) SHALL be securely blocked when it is in an elevated position.

(4) Chipper Loader

a. The loader operator SHALL be responsible for seeing that all workers are in the clear of the grapple hooks and swinging trees.

b. No person SHALL enter the working radius of the loader until the operator is visually aware of their presence. Only trained woodsmen SHALL be permitted to work within the immediate area of the loader and the chipper conveyor.

c. The operator SHALL take all precautions to prevent rock or metal from entering the chipper conveyor.

d. Signal to move equipment ahead SHALL be 2 blasts of the air horn; to stop, 1 blast; to back up, 3 blasts. The chipper operator SHALL give the signals and be responsible for the safe position of all crew members.

e. Repeated short blasts of the air horn SHALL be used to warn all crew members to become immediately alert to a dangerous situation.

f. Any member of the crew who recognizes a hazard SHALL immediately notify or signal the chipper operator who will promptly stop all operations until the danger is eliminated.

g. No one, other than the operator, SHALL be permitted on the chipper unit while it is being operated.

## 7.28 MULCH SPREADERS

### A. OPERATION

(1) The crew foreman SHALL be responsible for proper maintenance and safe operation of the mulch spreader. All crewmen should be instructed in procedures for safe operation of the spreader, asphalt tank-trailer and motor vehicles used for towing.

(2) The drive clutch SHALL be disengaged and the engine shut off before making adjustments or repairs near moving parts.

(3) The blower operator SHALL use pre-arranged horn signals to control movement of towing vehicle and the truck driver SHALL drive with extreme caution at all times.

(4) Operator feeding straw into machine SHALL wear leather-faced gloves and SHALL keep hands outside of mixing chamber when beater drum is in motion.

(5) Mulch material preferably should be baled with twine. If wired bales are used, wires SHALL NOT be fed into mixing chamber.

(6) An approved fire extinguisher SHALL be carried on mulch spreader at all times.

(7) Smoking SHALL NOT be permitted on or near this machine. Extreme fire prevention precautions SHALL be taken when using nitrate fertilizers and all nitrate bags and containers SHALL be buried or burned in a safe place.

(8) Lower jacks and block wheels securely before disconnecting trailer hitches and keep safety chains fastened when hitches are engaged.

7.28A.(9)

7.28 A. (9) Since the mulch spreader generates static electricity, the ground strap SHALL be kept in contact with the ground during operation.

B. PUBLIC PROTECTION

(1) "Men and Equipment Working" signs SHALL be placed at both ends of road section being worked to warn and protect traffic. HSC 7.24B(2)d.

(2) When using asphalt barrel on side carrier, a red flag should be attached to indicate limited clearance.

(3) Mulch spreader should not be operated while vehicles are passing if wind conditions might cause asphalt contamination or decreased visibility.

(4) Blower tube and all hoses SHALL be securely fastened and all loose articles SHALL be removed from machine before traveling

(5) Asphalt tank-trailer SHALL be towed behind spreader only when mulching. Trailer SHALL be towed between jobs with a vehicle no smaller than 1 1/2 ton 4 x 2 or 1 ton 4 x 4 rating.

7.29 TRAIL SCOOTER (Tote Goat, Merry Scooter, etc.)

(1) Prior to being permitted to operate a trail scooter an untrained man SHALL be instructed and checked out by a competent operator as follows:

a. Explain and demonstrate the brake system, throttle, automatic clutch, foot rests, kick stand, steering, starter, choke, short out button, and the proper way to grasp the twist-grip throttle with the right wrist level or straight.

EQUIPMENT

MACHINE

b. Show operator how to start motor, how to remove from kick stand and hold rear brake while doing so, how to mount the machine and start off.

c. Have operator ride the machine on a road or level ground under the observation of the trainer.

d. Have operator practice balance and smooth application of power. He must show proficiency in these two operational items before he is permitted to take the machine on a trail ride.

e. Riders of trail scooters should always keep in mind that "The Safety of the Operator Always Comes First." Extreme care must be taken when riding these machines on steep trails, extreme side slope or around bluffs or cliffs. Balance must be maintained and power must be applied evenly. If control is lost, do not try to hold the scotter; let it go and save yourself; stay on the trail.

(2) Operator traveling alone SHALL leave an itinerary with another forest officer or with a family member together with the estimated time of arrival at another location and return. A search SHALL be made if operator does not report in within a reasonable time.





## 7.3 SAFETY EQUIPMENT

### 7.31 GENERAL

(1) All woods workers SHALL provide themselves with nonskid shoes, snug-fitting clothing, cuffless, snag-proof, and tear-resistant trousers, gloves, long-sleeved shirts.

(2) Employees working in shops and around machinery in motion SHALL wear snug-fitting clothing such as coveralls, fastened from top to bottom, with sleeves snug at wrist or cut short, and nonskid shoes. They SHALL remove neckties, gloves, rings, or ragged clothing.

(3) Employees SHALL be furnished with one or more of the following where there is danger of blows or irritant and toxic substances coming in contact with the skin or clothing:

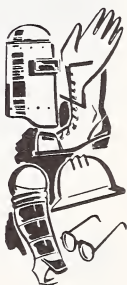
a. Protective clothing--hard hats, gloves, goggles, respirators, leg and footwear. HSC 5.12(1)

b. Protective ointment for exposed skin areas.

c. Necessary facilities and solvents "dry wash" soap, and hot water, for removal of toxic and poisonous substances.

d. First aid equipment.

e. Snakebite kits in snake-infested country.



## 7.32 FOOT AND LEG GUARDS, SAFETY SHOES

(1) They should be worn where there are hazards from--

a. Falling objects such as stones, rocks, or timber.

b. Sharp-edged tool cuts such as the adz, ax, broadax, brush hook.



## 7.33 EYE AND FACE GUARDS

(1) Workers SHALL wear goggles, safety spectacles, face shields, or welder helmets to protect their eyes from--

a. Small flying particles when cutting, drilling, scaling, and grinding metals, cutting, chipping, or dressing stone and brick, wood-working, overhead pruning, brushing, machine planting, and tree breeding.

b. Flying objects when hand drilling, chipping, calking, riveting, quarrying, rock cutting and crushing or when using a cyclone seeder or brush cutter.

c. Concentrations of cement or other dust, or dust and sand when sandblasting.

d. Hot metal when handling babbitt or pouring lead joints, or shaping metal on an anvil.

e. Gases, fumes, and liquids when handling acids and caustics, such as sulfuric or muriatic acids, ammonia, or creosote.



GRINDING



f. Injurious reflected light or glare such as snow exposure (colored glasses).

g. Injurious radiant energy and flying hot particles.



1. When using gas cutting welding torches, goggles SHALL be light-proof around the edges, ventilated, and fitted with lens of shade #4 for cutting, light welding and brazing; shade #5 for medium and heavy welding; and shade #6 when greater density is needed.

2. When using electric arc welder, welders SHALL wear welder helmets fitted with lens of shade #10 for ordinary metallic welding; shade #12 for carbon arc and heavy metallic welding.

3. Foremen and helpers SHALL wear shade #5 or #6 to protect them from indirect flashes of electric arcs.

4. Approved welder helmets with safe shade lens can be used in lieu of goggles. In either case they SHALL be frequently inspected and overhauled as needed.

5. Welders wearing glasses should be provided with approved welder helmets in lieu of goggles, to prevent glasses from steaming.



DRILLING OR  
ROUTING

(2) Goggle wearers should--

a. Keep goggles in protective containers when not in use.

b. Wipe the lens frequently with a clean cotton cloth or soft tissue.

c. Keep goggle frames, including side screens, free from dust and grit.

7.33(2)d.

7.33 (2) d. Change headbands frequently, keeping the webbing flat.

e. Treat lenses to prevent fogging when necessary, or use goggles ventilated around the lenses.

7.34 HARD HATS

(1) HARD HATS SHALL BE WORN--

a. WHERE THERE IS DANGER FROM FALLING OR FLYING OBJECTS SUCH AS ROCKS AND FROM TREES, LIMBS, HAZARDOUS EXCAVATIONS, BUILDING AND ROAD CONSTRUCTION JOBS, MACHINE PLANTING, BRUSH CHIPPING.

b. IN FELLING TREES AND SNAGS.

c. BY RIGHT-OF-WAY CLEARING CREWS AND DOZER OPERATORS IN LARGE OR DANGEROUS TIMBER

d. By blasters and powder men.

e. BY FIRE FIGHTING PERSONNEL WORKING WHERE THERE IS DANGER FROM ROLLING ROCKS, LOGS, FALLING LIMBS.

(2) Headband and hammock SHALL be adjusted to fit snugly, with an air space of 1/2 inch or more between the head and top of crown of hat.



PORTABLE GRINDER



HSC 5.12(1)



(3) Headband and hammock can be sterilized by thorough cleansing with detergent powder or saddle soap, followed by exposure to sun for 10 hours.

### 7.35 LIFE PRESERVERS

(1) Persons engaged in work where there is danger of falling in deep or swift water, SHALL be provided with suitable lifelines, vest-type life preservers, lifebelts, or life rings.

### 7.36 PARACHUTES

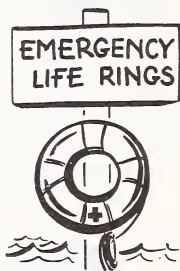
HSC 2.25

### 7.37 RESPIRATORS

(1) Chemical respirators SHALL be worn by persons exposed to harmful materials when fumigating, and to toxic fumes around chemicals, and when repairing or servicing equipment such as crushers under dusty conditions.

(2) Dust respirators SHALL be worn by workmen exposed to excessive dust caused by such work as quarrying, tunneling, rock crushing, stone power saws, jack hammer operation, cement work, sandblasting. They SHALL be worn also for certain types of road work, such as tractor or grader operations in light, dusty soils.

(3) Paint respirators SHALL be worn by workers using paint spray guns.



## 7.37(4)

### 7.37 (4) Respirator wearer SHALL--

- a. Be sure respirator fits face snugly.
- b. Inspect and sterilize respirator frequently. Wash it with soap and water to remove any corrosive material, such as oil, grease, or solvent on the rubber parts. Keep the filter or cartridge dry.
- c. Renew filters before they clog with dirt.
- d. Frequently replace dirty cloth face pieces with clean ones.
- e. Renew chemical cartridges as soon as objectionable odor is noticeable.
- f. Store respirator in a clean box away from heat and moisture.

## 7.38 RUBBER GLOVES

(1) These SHALL be worn where there is danger of electric shock or when handling toxic materials.

(2) Gloves SHALL be inspected and given the air test before they are used. Inspect gloves before use, then at 30-day intervals during use.

(3) Gloves SHALL be peeled off, instead of pulling on their fingers.

(4) Leaky gloves SHALL be destroyed, never patched.

## 7.39 SAFETY BELTS, ROPES, AND NETS

(1) These SHALL be provided and used to protect employees working from unguarded surfaces above ground, over excavations,

## EQUIPMENT



SAFETY

moving machinery, or dangerous waters, on steep slopes, or otherwise where individuals are subjected to falls hazardous to life and limb.

(2) They SHALL be inspected for worn, dry hard leather; pliability; worn or broken stitching; cuts; cracks; loose rivets; worn buckles, snaps, rollers, tongues, and D-rings.

(3) Safety belts and straps SHALL NOT be spliced or weakened by punching extra holes.

(4) Safety ropes SHALL be checked frequently for broken fibers. To check, twist the strands back.

(5) When available, safety seat belts SHALL be worn at all times when operating a motor vehicle or as a passenger, regardless of the distance to be traveled or the time involved.



HSC 2.11A(8)

# TYPES OF SAFETY EQUIPMENT RECOMMENDED FOR JOB HAZARDS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	Sparks	Hot Materials	Heat	Hot Liquids	Moisture	Acids and Alkalis	Slips and Falls	Falling Objects	Flying Particles	Electric Shock	Cuts and Abrasions	Dermatitis	Explosives	Machinery	
HATS, CAPS HELMETS	X	X	X								X	X			Asbestos
				X	X	X									Plastic-Rubber
	X	X										X		X	Cotton-Wool
	X							X	X	X	X				Metal
								X	X	X	X				Plastic
COATS, APRONS	X	X	X												Asbestos
	X	X		X					X		X				Chrome Leather
WAIST PROTECTION				X	X	X				X			X	X	Plastic
				X	X	X				X	X	X			Rubber
								X		X			X		Canvas-Fiber
SLEEVES	X	X	X												Asbestos
WRISTLETS	X	X	X						X		X				Chrome Leather
	X	X	X						X					X	Flameproofed Duck
				X	X	X									Plastic
				X	X	X									Rubber
GLOVES	X	X	X												Asbestos
MITTENS	X	X		X					X		X				Chrome Leather
HAND PADS				X	X	X				X		X			Rubber
FINGER GUARDS				X	X	X						X			Plastic-Rubber Coated Fabric
											X				Metal Mesh
											X				Cotton-Canvas
PANTS, KNEE PADS, LEGGINGS	X	X	X												Asbestos
	X	X	X						X		X				Chrome Leather
	X	X	X						X					X	Flameproofed Duck
	X							X	X	X				X	Fiber-Metal
				X	X	X						X			Plastic
				X	X	X				X	X				Rubber
SHOES BOOTS								X			X			X	Steel Toe Cops
					X	X									Non-Skid Shoes
	X	X	X	X	X	X					X				Wooden Soles
	X	X	X	X	X	X									Chrome Leather
			X	X	X					X	X				Rubber
													X		Conductive Rubber



6181.02 Health and Safety Code

# CHAPTER

# 8

## Buildings and Grounds



—— Color Code



Electricity



—— Laboratories & Chem.



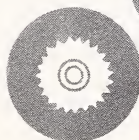
Offices and Dwellings



—— Repair Shops



Warehousing



—— Wood & Metal Shops



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## 8.1 COLOR CODE

8.11 COLOR IDENTIFICATION MARKING STANDARDS SHALL be used to draw attention to safety equipment as well as relative degrees and types of hazards. Regular and light-reflecting enamels or transfer signs may be used. Quantity of color coding in any given area should be discretionary as over-use will reduce total effectiveness.

(1) SAFETY GREEN--For Safety equipment, such as--

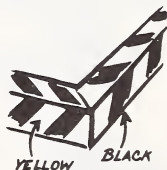
- a. Medicine cabinets.
- b. First aid kits.
- c. Safety bulletin boards.
- d. Safety instruction signs.
- e. Starting buttons on machines.

f. Clean rag containers.  
g. Safety showers.  
h. Emergency equipment, such as stretchers, gas masks, and respirator containers and resuscitation kits.



(2) HIGH VISIBILITY YELLOW. To mark physical obstacles, such as striking against, stumbling, falling, caught between, and tripping hazards. Highest visibility of any color under nearly all light conditions. Parallel bars of yellow and black have unusually strong attention value. Use on--

- a. Construction equipment, such as bulldozers, tractors, graders, and carryalls,
- b. Movable objects, such as floor or overhead cranes, floor jacks,



BLDGS. AND GROUNDS

COLOR CODE

8.11(2)b.

stands, hydraulic hoists, chain hoist blocks and hooks, and loading buckets.

c. Edges of unguarded platforms, wells, open pits, and aisle markings around hazards.

d. Projections, protruding parts, low beams and pipes, low or impaired clearances, and coverings or guards for guy wires.

e. Conveyor parts or other fixtures suspended at hazardous levels from ceiling or walls and extending into normal operating areas.

f. Elevation changes, such as stairway approaches, top and bottom steps, risers of off-standard steps, raised door sills, and curbing.

g. Pillars, posts, columns, and aisle obstructions that might be struck, such as those located in or near passageways.

h. Frames of elevator doors and gates; lips of horizontally closing doors.

i. Outdoor traffic signs and dead ends.

j. Handrails and guardrails.

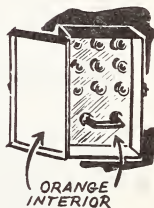
k. Unsafe drinking water supply.



(3) ALERT ORANGE. To identify extreme hazards that can crush, cut, electrocute, explode, or poison. More attention value than any other color. Use on--

a. Stop buttons on machines.

b. Exposed parts of turning wheels, rims, edges of pulleys, wheels, sprockets, gears, and chains.



BLDGS. AND GROUNDS

COLOR CODE

c. Narrow strip on cutting edge of cutting devices and rollers.

d. Moving control wheels and levers on lathes, drill presses, etc. Paint only spokes of control wheels.

e. Containers for explosives or highly combustible materials and greasy rags.



(4) FIRE PROTECTION RED. For Fire equipment and specific dangers. Use on--

a. Extinguishers (or boards on which they are mounted), hose nozzles and connections, sirens, pumps, fire tool and ladder markings, buckets, pails, and water barrels.

b. Fire alarm stations and hydrants.

c. Fire doors and exit lights.

d. Safety cans and gasoline dispensing pumps.

e. Danger signs.

f. Water faucets or hydrants used for fire protection.



(5) RADIOACTIVITY VIOLET. To identify all radioactive hazards, such as radioisotopes and treated plots.

(6) PRECAUTION BLUE. To caution against operating certain equipment. Use on--

a. Machinery and equipment that should not be moved or started.

b. Machinery and equipment being repaired.



## 8.11(7)

8.11 (7) CAR COLORS. Body, safety green; top, safety gray. (Selected for high visibility in both summer and winter in forest and range settings.)

### (8) TRAFFIC WHITE, GRAY AND BLACK.

Good housekeeping and indoor traffic colors. Use on--

- a. Marking for locations and width of aisles, passageways, and dead ends.
- b. Marking for good housekeeping facilities.
- c. Floor areas immediately surrounding waste receptacles.
- d. Traffic controls.
- e. Corners.
- f. Walkways--gray or black.
- g. Floor--gray.
- h. Storage areas.
- i. Waste receptacles.



(9) INTERIOR WALLS AND CEILINGS. Use light green, flat buff, gray, cream, or white for high reflection value.



### (10) FIXED SHOP EQUIPMENT.

Use contrasting colors, such as green on body, and yellow or orange on moving parts. Use colors that reflect rather than absorb light.

### (11) PIPING SYSTEMS. Use these

colors--

- a. Green, white, black, gray, or aluminum for safe materials such as water, brine, compressed air, hot water below 212° F., and cold water pipes.
- b. Yellow or orange for dangerous materials, such as acids, gases, and water hotter than 212° F.
- c. Red for fire protection and sprinkler systems.

BLDGS. AND GROUNDS

COLOR CODE

8.12 COLOR STANDARDS (based on the following Pittsburgh paint specifications or their equals)--

(1) Safety Green (Vista Green UC-10076)

(2) Alert Orange (Focal Orange UC-10081)

(3) High Visibility Yellow (Focal Yellow UC-10078)

(4) Fire Protection Red (Focal Red UC-10080)

(5) Precaution Blue (Focal Blue UC-10077)

(6) For automobiles, FSS 595 Safety Green 14260, Gray 16307

### 8.13 FLUORESCENT AND LIGHT-REFLECTING PAINTS AND SIGNS

These should be used where hazards justify it. Decalcomania or other transfer signs are also acceptable.

FSH 2 5630.6

### 8.14 SAFETY SIGNS SHALL CONFORM TO STANDARDS IN THE SIGN HANDBOOK,

(1) DANGER. To warn of specific dangers only, such as electrical or explosive hazards, and "No Smoking" areas. White background on face of sign. "Danger" in white letters set in red oval, set in black rectangular panel. Red and black to be separated by white line. Message in black letters on the white background.



BLDGS. AND GROUNDS

COLOR CODE

## 8.14(2)

8.14 (2) CAUTION. To warn of possible dangers or unsafe practices. Yellow background on face of sign. "Caution" in yellow letters set in black panel. Message in black letters on the yellow background.



(3) SAFETY INSTRUCTION. To provide information relating to general safe practices, such as good housekeeping. White background on face of sign. Heading in white letters set in green panel. Message in black letters on the white background.

(4) DIRECTION. To indicate the way to stairways, fire escapes, exits, and other locations. Black letters on white background.



(5) INFORMATION. To carry messages of a general nature, such as rules, regulations, and markers when such postings do not conflict with "Danger" or "Caution" signs. Message in black on white background.







## 8.2 ELECTRICITY

### 8.21 GENERAL

ALL INSTALLATIONS AND MAINTENANCE INVOLVING WIRING, FIXTURES, EQUIPMENT, APPLIANCES, TECHNIQUES, AND PRACTICES SHALL COMPLY WITH THE ELECTRICAL SAFETY CODE, NATIONAL BUREAU OF STANDARDS HANDBOOK H-30, NATIONAL ELECTRIC CODE, STATE OR AREA CODES, WHICHEVER IS APPROPRIATE. SUBSTANDARD CONDITIONS OF CONSTRUCTION, INSTALLATION, AND MAINTENANCE WILL BE UP-DATED TO CURRENT STANDARDS OR DISPOSED OF.

NBS HANDBOOK  
H-30



### 8.22 INSTALLATION AND REPAIR-- DANGER SIGNS.

HSC 8.14(1)

(1) Wiring in building, other than minor repairs to disconnect electrical cords or plugs, SHALL be made only by a competent electrician, licensed in states requiring licenses.

(2) Power SHALL be shut off before work is done on "hot" lines. Exceptions: An authorized electrician, in an emergency, may work on a live line not exceeding 220 volts.



8.22(3)

8.22 (3) The lock on seal switches supplying current to lines upon which work is being done SHALL be locked in the "off" position to prevent accidental closing. A warning tag SHALL be attached indicating work in progress.



HSC 3.21(5)

(4) Access to switch, fuse, and breaker boxes SHALL be kept clear.

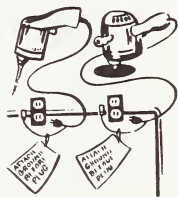
(5) Changes or repairs to company-owned lines leading to the master service switch SHALL be made only by the power company.

(6) Loose wires hanging from buildings or poles SHALL NOT be touched until you are certain they are not connected to a live source of electricity.

(7) Insulation on live wires SHALL NOT be trusted.

(8) Frames of motors, including portable electric handtools, SHALL be grounded. HSC 7.18(2)

(9) Caution SHALL be exercised in connection with fixed installations of portable power tools installed or used in hazardous locations such as damp areas and household appliances used in kitchens, bathrooms, or basements where contact with water pipes may be made; or near gas or volatile liquids.



(10) Damaged or defective wiring, outlets, fixtures, connections, switches, etc., SHALL be remedied upon discovery or put out of service until proper repairs are made.

(11) The power company SHOULD be notified in advance concerning work to be done near powerlines or high voltage installations.

(12) Switch SHALL be pulled before cartridge-type fuses are removed or replaced.

(13) Larger fuses than appropriate for the circuit wire SHALL NOT be used. When in doubt, use 15-ampere fuse and have an electrician ascertain if wiring will permit larger size.

(14) Circuits SHALL NOT be overloaded. Where excessive use of appliances results in frequent fuse failure, redistribute plug-in appliances or have additional circuits installed.

(15) The relationship of plumbing fixtures and electric outlets and switches in bathrooms, laundries, laboratories, engine rooms, etc., may create potentially fatal electric shock conditions. In so far as practical, such rooms SHALL be designed or altered to:

a. Make it impossible for anyone to reach an electric outlet or switch while in or on a wet surface in contact with a grounded conductor (i.e., bathtub or area in front of a wash tub.)

b. Install outlet plugs or switches at a distance in excess of a person's extended reach from bowls, tubs, etc.

c. Provide for grounding of electric outlets, switchboxes, appliances, etc.

d. Install plastic or other non-conductor cover plates and switch coverings.



## 8.22(15)e.

8.22(15) e. Install water pipes and drains through the wall to eliminate the possibility of creating a grounded conductor across wet surface of the floor.

(16) Use of extension cords SHALL be subject to these restrictions--

- a. Disconnect by pulling the plug, not the cord.
- b. Replace when worn, frayed, or brittle.
- c. Hang on nonflammable non-conductors or insulated staples.
- d. Tie the wires by Underwriter's knots when repairing plugs permitting this practice.
- e. Store them in a cool, clean, dry place where they can lie loosely coiled.
- f. Do not allow them to become kinked or come in contact with oil, grease, or chemicals.
- g. They SHALL NOT be inserted through walls unless correctly insulated wire is used.



(17) All electric tools and appliances should have polarized plugs (third wire for grounding.)

## 8.23 EQUIPMENT

(1) Electrician's handtools SHALL be in good repair and restricted to their proper use.

(2) Rubber gloves SHALL be inspected and given an air test before they are used. Gloves and similar equipment SHALL be inspected before use, and then at 30-day intervals during use.



(3) Only non-conducting ladders SHALL be used for electrical work.

(4) For fire emergencies, current SHALL be turned off first, if possible.

(5) Electric appliances SHALL never be touched with wet hands. (i.e. refrigerator, washing machine, dryer, etc.)

(6) Metal pull cords SHALL have link insulators or SHALL be extended with ribbon or twine.



## 8.24 POWER LINE RULES

These general rules SHALL be used for working in the vicinity of powerlines:

(1) ALWAYS TREAT ALL POWERLINES AS DANGEROUS.

(2) Workers SHALL be especially careful to prevent wire rope, telephone lines, derrick booms, water from fire pumps, or other conductors from coming within 15 feet of high-voltage wires. Where there is less clearance or where there is any question about the electrical hazard, consult your work supervisor or power company authorities before starting work or making changes.



(3) Power shovels, booms, and other machinery, telephone wire, pipe, drills, well casing, and other such materials SHALL be moved with extreme care when in the vicinity of powerlines. The clearance SHALL be at least one and a half times the length of the boom plus the material being handled.

## 8.24(4)

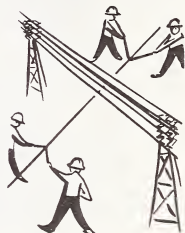
8.24 (4) Surveying and measurements in the vicinity of powerlines SHALL be made--

- a. With clean, dry, wood rules, or non-metallic cloth tapes.
- b. By the stadia method.
- c. By frequent "breaks" of tape, to avoid long spans across canyons.
- d. By offsetting away from dangerous areas.

DRY NON-METALLIC TAPE



(5) Telephone wire being stretched beneath a powerline SHALL be held securely from contact with the powerline by means of a clean, dry rope in sound condition, a short distance on each side of the crossing.



(6) When a telephone line is supported on the same poles with a powerline, everyone in contact with the ground, steel pole or tower, and ground wire or other ground potential SHALL remain clear of the wire while it is being stretched.

(7) Crews felling timber in the vicinity of a powerline SHALL take adequate measures to prevent the tree from falling on the powerline, such as one or more heavy rope lines securely anchored. The rope SHALL be fastened high enough on the tree being felled to provide good leverage.



(8) Brush SHALL NOT be burned close to powerlines because flame is a conductor of electricity. Also, heating of power line will increase sag.

BLDGS. AND GROUNDS

ELECTRICITY



(9) A stream of water SHALL NOT be played on or near a line that may be electrically charged. Use water only after a responsible power company employee has tested the line and found it to be dead. In the meantime, any work necessary to control a fire SHALL BE done with all men, hose, and equipment at a safe distance from all broken or sagging conductors.

(10) Automatic breaker action on one or both ends of a line does not make it safe. The breaker may be reclosed, or the line may be subject to induced voltage. Powerline conductors SHALL be handled only by company employees.

(11) The first contact with a telephone wire that passes in the vicinity of power lines SHALL be made with the back of the hand, so that hand will not involuntarily close and grip a hot conductor.



(12) Be alert to avoid contact with low power line with long radio antenna mounted on vehicle. If not possible to move vehicle safely, stay in it until current can be turned off or jump clear being sure not to touch vehicle and ground at same time.

(13) The condition of all powerlines on land administered by the Forest Service that may affect the National Forest, our personnel, or the public SHALL be checked. All broken or leaky insulators, line breaks, broken poles, or dangerous trees or other conditions that appear to be unsafe SHALL be reported promptly to responsible power company officials.



# 8.25 RESCUE

(1) Those engaged in any electrical work SHALL be able to give artificial respiration and first aid treatment for burns and traumatic shock to victims of electrical shock.

## First Aid Guide

(2) To rescue persons in contact with live wires--

a. Assume that wire is alive and do not allow it to touch you.

b. Do not touch victim with bare hands until wire is removed.

c. Use a nonconductor such as dry pole or dry rope to pull wire from victim.

d. Shut off current at nearest switch.







## 8.3 LABORATORIES AND CHEMICALS

### 8.31 GENERAL

(1) Few chemicals are harmless in all respects. They injure living tissue in many relative and variable degrees by burning, blistering, disintegration, and disorganization, externally and internally. Most insecticides and/or poisons are more readily absorbed when in an oil or solvent than when in a water solution or when they are dry. Lethal doses can be absorbed through the skin, lungs, and by mouth.



(2) Breathing fumes, poor housekeeping, and personal uncleanliness are the greatest sources of danger around chemicals. The best clothing and safety devices will not provide complete protection. Care in handling dangerous chemicals and effective use of first aid procedures are equally essential.

First Aid Guide

(3) Manufacturers' instructions regarding safety SHALL be followed unless they have been altered in writing by the responsible supervising officer.



(4) Persons with allergies for certain chemicals SHALL NOT be assigned to work with those chemicals.

8.31(5)

8.31 (5) Project workers handling containers of chemicals SHALL be under the supervision of a person prepared to render immediate first aid in case of spillage or breakage. They SHALL avoid breathing fumes, vapors, or dust that may result from such spillage or breakage. Showers should be provided for immediate washing off of dangerous chemicals.



## 8.32 FIELD AND LABORATORY WORK

(1) Safety equipment, first aid kits, and extinguishers SHALL be readily available for emergencies, and employees SHALL be trained in their use.

(2) Chemicals in heavy containers should be stored on or near the floor, where they are protected from falling or colliding objects.



(3) Chemicals that react with dangerous effect SHALL be stored so that undesirable reaction SHALL NOT occur if the containers break.

(4) Extra caution SHALL be used when handling glassware. For example, large bottles should not be picked up by their rims. Use toweling if there are dangers of breakage. Be sure hands are dry when handling chemical containers.

(5) Each chemical laboratory should be equipped with fume hoods with adequate exhaust. Work with volatile solvents or toxic material should be carried out under hoods.

HSC 7.3

3.3

First Aid Guide

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## 8.33 JOB PLANNING

(1) When it is decided to use a chemical on a project, complete information as to its formulation and poisonous, flammable, and corrosive characteristics SHALL be reviewed. Any special equipment or devices needed for applying the chemical or protecting the employees handling the chemical SHALL be specified in the project plan. Such equipment and devices SHALL be obtained prior to the use of the chemical.

(2) One person SHALL be designated to supervise the project use of chemicals, including their transportation, mixing, and storage.

a. He SHALL be designated only after he has acquired thorough knowledge of the safe handling techniques of the chemical to be used, including--

1. Poisonous, flammable, or corrosive characteristics of chemical.
2. Characteristics of base material, if chemical is diluted for application.
3. Transportation, mixing, and storage of chemical and base.
4. Use and care of equipment.
5. All precautions needed, such as fire protection, safe clothing, and protective devices.
6. Safe work methods.
7. Chemical first aid procedures.

## 8.34 STORAGE AND TRANSIT

(1) Chemicals SHALL be kept separated from other materials in a well-ventilated location, such as a paint house, where there is no danger of food contamination, either in transit or in storage.

(2) Only sufficient amounts of highly poisonous, corrosive, or flammable chemicals SHALL be purchased to meet current needs and prevent prolonged storage periods wherever possible.

### 8.34(3)

8.34 (3) All chemical containers SHALL be labeled (use color codes) as to contents, and whether they are poisonous, flammable, or corrosive. If in doubt about contents of an unlabeled container, they SHALL be disposed of. Storage should not exceed head height. When chemicals are stored in a drawer, the drawer should be partitioned to avoid breakage of bottles.



HSC 8.1  
8.36

(4) Chemicals in glass bottles SHOULD be kept out of the sun and away from heat. Avoid storage in buildings exposed to sun and provide ventilation.

(5) Adequate warning signs SHALL be displayed prominently stating precautions necessary around stored chemicals.

(6) Storage place SHALL be cleaned thoroughly before using for other purposes.

(7) Dangerous, poisonous, flammable, or corrosive chemicals SHALL be kept in locked room when not occupied.

(8) Walk-in refrigerators used to store chemicals should be equipped with:

- a. Safety latches to enable one to open door from inside.
- b. An adequate alarm system.
- c. Internal light switching system SHALL be provided, with mercury switch.
- d. An emergency light source SHALL be provided.
- e. Explosion-proof door.



f. Refrigerators should be properly wired, grounded, and insulated against possibility of sparks when flammable chemicals are stored within.

(9) Compressed gases handling and storage-- HSC 6.74

a. Compressed gas is any material or mixture exceeding a pressure of 40 pounds per square inch at 70° F. in tanks, spheres, drums, tubs, and cylinders.

b. Containers should be marked showing contents, flammability, and if liquified or gas in solution.

c. Containers should be handled carefully by trained personnel.

d. Empty containers SHALL be labeled and stored separately.

e. Valves on containers should be capped and protected when the valve is not connected with a line for use.

f. Valves should be opened slowly. Wrenches SHALL NOT be used unless provided or directions specify.

g. Suitable regulators with shut-off valve should be provided for specific type of gas being used.

h. Regulators and hose should not be interchanged for different gases.

i. Gas containers should be stored in dry, uniform temperatures away from exposure to bumping or falling.



8.34(9)j.

8.34(9) j. Common industrial gases:

Gas	Physical State as Shipped	Effect When Breathed	Flammable	Flammable Range with Air (%)
Acetylene	Dissolved	Anesthetic	Yes	2.5 to 80.0
Ammonia	Liquid	Irritant	Yes	16.0 to 26.0
Butane	Liquid	Anesthetic	Yes	1.9 to 8.5
Carbon dioxide	Liquid	Asphyxiant	No	None
Chlorine	Liquid	Irritant	No	None
Ethyl chloride	Liquid	Anesthetic	Yes	4.3 to 14.8
Ethylene	Liquid	Anesthetic	Yes	3.0 to 34.0
Helium	Gas	Asphyxiant	No	None
Hydrogen	Gas	Asphyxiant	Yes	4.1 to 75.0
Hydrogen cyanide	Liquid	Toxic	Yes	12.7 to 27.0
Methyl chloride	Liquid	Anesthetic	Yes	8.3 to 19.7
Nitrogen	Gas	Asphyxiant	No	None
Nitrous oxide	Liquid	Anesthetic	No	None
Oxygen	Gas	Life sustaining	No	None
Propane	Liquid	Anesthetic	Yes	2.2 to 9.5
Sulfur Dioxide	Liquid	Irritant	No	None

8.35 MIXING AND USING

(1) A suitable, well-ventilated site, with ample space or exits for workers to leave a contaminated atmosphere, SHALL be selected for mixing operations. An ample supply of water SHALL be readily available to dilute chemical burns and flush away spills. Where dangerous chemicals are regularly mixed or used, a shower head should be installed with chain extending and attached to the floor. Shower and chain should be tested frequently. Soap, towels, and first aid equipment SHALL be immediately available for removing or diluting chemicals spilled on workers or their clothing. Approved fire extinguishers SHALL be available, and smoking and open flames SHALL be prohibited when flammable chemicals are used. All electrical switches and motors in the area SHALL be turned off or grounded to prevent sparking or arcing.



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(2) Workers mixing or using acid, poisonous or corrosive substances SHALL wear, where appropriate, approved protective accessories such as gloves, goggles, face masks, aprons, and long-sleeved, high-necked clothing that will expose as little of the skin as possible.



a. If skin contact cannot be avoided, workers SHALL--

1. Apply lanolin products or silicone to exposed skin before exposure and repeat several times during day.

2. Wash irritated part with soap and warm water, dry, apply calamine or lanolin lotion or similar. If irritation persists, consult a physician.

3. Avoid getting chemical solutions in the eyes. If it enters the eyes, flush with large quantities of water, and consult a physician.

b. Workers with dangerous chemicals on clothing and equipment SHALL:

1. Change clothing, bathe with soap and hot water, and put on clean clothes.

2. Scrub equipment such as packboards soaked with chemicals with warm water and soap.



(3) Workers SHALL avoid breathing chemical sprays, gases, vapors, fumes, or dust as much as possible, and SHALL wear approved respirators or masks when suggested by the manufacturers of the chemicals.

(4) Chemicals SHALL be dusted or sprayed so that they don't blow on the operator or others.



8.35(5)

8.35 (5) Dangerous substances like allyl alcohol, alkalies, or acids SHALL be removed from their containers by pump, ejector, or siphon. The mouth SHALL NOT be used to prime siphon tube. To dilute chemicals, always pour into the diluting solution, never the reverse.



(6) Workers who complain of headache, nausea, giddiness, or body pains while using or after using chemicals SHALL be taken to a doctor immediately.

(7) Precautions SHALL be taken to prevent animals from eating toxic chemicals on treated vegetation, such as by adding animal repellants.

(8) If worker shows signs of being allergic to chemicals, transfer him to other work.

(9) Post antidotes broadly:

First Aid  
Guide

a. Poisons not acid or alkali

1. DILUTE: Give large

amounts of fluid, 4 to 7 glasses of solution of 1 teaspoon of either baking soda or salt in 1 glass of warm water, warm dish water, or milk if caustics like lye or ammonia have been taken.

b. Acids--

1. Avoid vomiting if possible.

2. Neutralize with weak al-

kali such as baking soda, magnesia, chalk, in water.

3. Give milk, olive oil, or

egg white.

c. Alkalies--

1. Avoid vomiting if possible.

lemon juice or vinegar.

3. Give milk.



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## 8.36 DISPOSAL OF UNUSED CHEMICALS AND CONTAINERS

(1) Small quantities of chemicals remaining at end of project SHALL be disposed of in one of the following ways:

a. Flammable liquids SHALL be destroyed by burning. They SHALL never be poured into drains or sewers. Exception: If it mixes with water, dissolve in at least 20 parts of water and flush down drain.

b. Acids or alkalies can be destroyed by diluting them with water and flushing down the sink. When diluting an acid or alkali, it SHALL always be poured slowly into water, never the reverse.

c. Dangerous chemicals such as those capable of making poisonous gas SHALL NOT be emptied into drains, but SHALL be destroyed by someone familiar with handling chemicals. Chemicals should only be flushed down the drain in prescribed manner. Local regulations are applicable.

(2) Chemicals in storage for periods exceeding the maximum period recommended by the manufacturer should be disposed of properly.

(3) Containers, liners, and debris from toxic, flammable, or corrosive chemicals SHALL be buried in an appropriate place and at a depth that will prevent them from being exposed by rooting or digging animals, such as hogs or dogs.

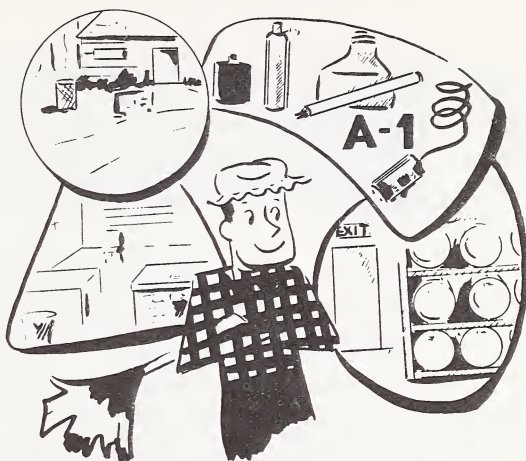


HSC 8.36(1)



8.36(4)

8.36 (4) Tanks or cylinders SHALL be labeled "EMPTY" when their contents have been used.



## 8.37 CHEMICALS USED IN OUR WORK

(1) Allyl Alcohol is extremely dangerous, explosive, flammable, poisonous, and corrosive. Use of Economic Poisons, Department of Health, Education & Welfare  
Fumes are blinding.

a. It SHALL be kept tightly sealed, away from heat, flame, gas, or oil, 50 feet from buildings or in a separate shed.

b. Equipment SHALL be grounded for static electricity.

c. Equipment SHALL be thoroughly flushed after use.

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LABS AND CHEMICALS

d. Any spills on skin or clothing SHALL be removed immediately with soap and water to avoid serious burns.

(2) Ammate (Ammonium Sulfamate) is not poisonous or flammable, but excess contact SHALL be avoided. Exposed skin SHALL be washed frequently and at end of shift. Clothing SHALL be cleaned at least once a week.

(3) Arsenic Oxide is poisonous and corrosive. Workers SHALL avoid breathing the dust. Wash dust from skin.

(4) Atlacide is flammable. Treat HSC 8.37(27) like Sodium Chlorate.

(5) Benzine Hexachloride (5--10% dust) is a skin irritant and stomach poison. Worker SHALL wear goggles, respirator, and gloves.

(6) Calcium Chlorate is highly flammable and explosive when in contact with organic or other combustible materials. Clothing SHALL be changed if chemical gets on it.

(7) Carbon Dioxide (Dry Ice) can cause serious burns in direct contact with the skin and may cause asphyxiation when large amounts are used in poorly ventilated rooms.

(8) Carbon Tetrachloride is extremely poisonous and may be fatal to persons who breathe vapors for long periods.

- a. Adequate ventilation SHALL be provided.
- b. Keep it off the skin.

(9) Chlordane Dust is more poisonous than DDT. Avoid breathing it.

8.37(10)

8.37(10) Chlorinated Lime will burn eyes and skin.

a. Precaution SHALL be taken to keep it out of eyes, nose, and mouth.

b. It SHALL NOT be stored in airtight containers.

c. Cans of Chlorinated Lime SHALL be punctured before storing to prevent accumulation of internal pressure that can scatter the lime when can is opened.

(11) Chloropicrin or tear gas users SHALL wear gas masks at all times, except where it is used only as an indicator, e.g., in niethyl bromide.

(12) Copper Sulfate is midly poisonous. Workers SHALL wash carefully and keep clothes clean.

(13) Creosote. --See Wood Preserving. HSC 5.7

(14) Cyanides are extremely poisonous.

a. When fumigating, warning signs and barriers SHALL be placed at all building entrances.

b. Workers SHALL work in pairs and each be provided with and wear a mask designed to protect him against cyanide.

c. When fumigation is complete, doors and windows SHALL be opened by persons wearing respirators. Adults SHALL enter only after 12 hours of airing; children only after 18 hours.

(15) DDT is less poisonous than Sodium Fluoride, but it is flammable.

a. All food supplies SHALL be covered when spraying is being done.

b. Avoid breathing fumes from DDT.

c. After using DDT wash with soap and warm water.

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d. Washing facilities should be provided so solution spilled on skin will not be absorbed.

(16) Dinitro Amyl Phenol is a poisonous chemical and SHALL be treated accordingly.

(17) Ethylene Dibromide is poison- HSC 8.37(1)  
ous and will blister the skin. Treat like  
allyl alcohol.

(18) Endrin treated seed is dangerous and should be treated accordingly.

(19) Methyl Bromide is more poisonous than ethylene dibromide. Treat HSC 8.37.(1)  
like allyl alcohol.

a. Cans SHALL be tightly packed for transportation.

b. Cans SHALL be stored in a cool, dry place, in tight metal cabinet, never with gas or oil.

c. Cans SHALL be opened outside and destroyed immediately after use.

d. In storage, cans SHALL be watched closely for signs of corrosion releasing the gas.

e. Applicators and gasproof covers SHALL be thoroughly cleaned before they are stored.

(20) Mineral Spirits are flammable.

a. Equipment and drums SHALL be grounded for static.

b. There SHALL be no smoking.

(21) Orthodichlorobenzene is flammable in oil solution.

a. If fluid enters eyes, wash eyes immediately with large amounts of water and treat with lanolin. Goggles should be worn.

b. Skin and clothing SHALL be washed frequently.

8.37(22)

8.37(22) Parathion is flammable and highly poisonous.

- a. Respirator SHALL be worn.
- b. Avoid getting it on skin or breathing it.
- c. Wash from skin with soap and warm

water.

- d. Clothing should be changed daily.

(23) Pentachlorophenol is flammable HSC 5.71 and poisonous. It causes dermatitis. It is sometimes used with flammable solvents.

- a. Avoid breathing it and getting it on skin.
- b. Wash from skin immediately.

(24) Polybor Chlorate can be ignited by friction. It is explosive and flammable when in contact with organic matter or other combustible material.

(25) Sodium Arsenite is poisonous and causes burns and skin irritations. It SHALL be mixed outside. Safe handling methods SHALL be used.

(26) Sodium Chlorate can be ignited by friction. It is explosive and flammable when in contact with organic matter or other combustible material.

a. It SHALL be mixed on the job, never transported in solution.

b. Workers SHALL change clothes on the job and wash work clothes at least once a week.

c. Containers, liners, and debris SHALL be burned immediately.

d. Fire extinguisher SHALL be readily available.



(27) Sodium Chromate is poisonous. Avoid breathing it. Wash from skin immediately.

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(28) Sodium Fluoride SHALL be treated like sodium chromate.

(29) Sodium Fluoroacetate (1080) is a deadly poison.

a. Workers SHALL be specially trained before using it.

b. Extreme care SHALL be taken in storing and using it.

c. Use metal spoon for mixing.

(30) Sodium Pentachlorophenate (Crystalline) is poisonous. Workers SHALL cover eyes and face with mask, or wear tight goggles and respirator.

(31) Sodium Trichloroacetate is poisonous.

a. Workers SHALL avoid breathing it and getting it on skin or in eyes. If it enters eyes, flush with large quantities of water.

b. Workers SHALL change clothes daily.

(32) Strichnine and Strichnine Alkaloid are very poisonous.

(33) Sulfur Dioxide is poisonous and irritating.

(34) Sulfuric Acid is corrosive and dangerous to handle. To dilute, always pour acid slowly into water.

(35) Thallium Sulfate is a deadly poison.

(36) 2,4-D is mildly poisonous and is flammable in an oil base.

(37) 2,4,5-T is mildly poisonous and flammable in an oil base.

(38) Warfarin (Warf 42) is toxic.



8.37(39)

8.37(39) White Arsenic is very poisonous and a powerful skin irritant.

- a. Wash from skin immediately.
- b. Change clothes daily.
- c. Wear protective clothing, coveralls, goggles, and mask.

(40) Zinc Chloride is a poison.

(41) Teflon is highly toxic when heated above 400° F. The gases given off can be deadly.

(42) Cycloheximide concentrate is poisonous and combustible. Avoid contact with skin. Do not inhale fumes or spray mist.

a. Extreme care SHALL be taken in storing. Keep away from heat, flames, sparks, etc.

b. Fire prevention measures SHALL be taken at all mixing stations.

c. For use and handling instructions, refer to White Pine Blister Rust Control. HSC 5.23

(43) Phytoactin concentrate is poisonous and combustible. Avoid contact with skin. Do not inhale fumes or spray mist.

a. Extreme care SHALL be taken in storing. Keep it away from heat, flames, sparks, etc.

b. Fire prevention measures SHALL be taken at all mixing stations.

c. For use and handling instructions, refer to White Pine Blister Rust Control. HSC 5.23

8.38 CHEMICALS--References--Information on the accident and health protection phases of the various chemicals and gasses can ordinarily be obtained from the manufacturer. Other good sources of information include:

- ASA - American Standards Association, Inc.  
70 East 45th Street  
New York 17, New York
- MCA - Manufacturing Chemists' Association  
1825 Connecticut Avenue, N. W.  
Washington 9, D. C.
- AIHA - American Industrial Hygiene Assoc.  
14125 Prevost  
Detroit 27, Michigan
- NSC - National Safety Council  
425 North Michigan Avenue  
Chicago 11, Illinois
- CGA - Compressed Gas Association  
11 West 42nd Street  
New York 36, New York
- ACSC - Association of Casualty & Surety Companies  
Accident Prevention Department  
60 John Street  
New York 38, N. Y.

#### 8.39 RODENT AND PREDATOR CONTROL

(1) Specific training or instructions concerning the safe storage, transportation, and application of poisons or poisoned baits SHALL be obtained from the U.S. FISH AND WILDLIFE SERVICE or other qualified agency in advance of use.

(2) Only personnel who have been trained or instructed in advance SHALL be assigned the storage, transportation, and application of poisons.



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LABS AND CHEMICALS

8.39(3)

8.39 (3) Poisons SHALL be plainly labeled at all times. They SHALL be stored under lock and key where they are not accessible to unauthorized persons, especially children.

(4) Any remnants remaining following treatment SHALL be disposed of promptly following prescribed procedures. HSC 8.36

(5) Characteristics of Common Rodenticides. U.S. Fish & Wildlife Ser. Leaflet WL-337



## 8.4 OFFICES AND DWELLINGS

### 8.41 MANDATORY OFFICE REQUIREMENTS

(1) Space SHALL conform with all local, State, and Federal regulations regarding building codes, lighting, fire protection, sanitation, and health.

(2) Sufficient lighting SHALL be provided so that all employees can see and avoid the normal hazards in storerooms, halls, and offices.

(3) Fire-protection system SHALL be checked annually. It SHALL be fully understood by all employees.

(4) Aisles, halls, and stairways SHALL be clear of objects that might cause employees to fall.

(5) Elevators SHALL be operated within safe carrying capacities.

(6) File cabinets and steel shelves SHALL be fastened when practicable.

(7) Bottom drawers in file cabinets SHALL carry heaviest loads wherever possible.

(8) Desk and file drawers, cabinet doors, and bookcase sliding doors SHALL be closed when not in use. Materials should not be stored on top of file cases, cabinets, bookcases, etc.

*DON'T FILE  
SAFETY  
KEEP IT  
ACTIVE!*



8.41(9)

8.41 (9) Extension cords for electrical equipment and telephones SHALL be placed where they are not tripping hazards.

(10) Wornout insulation and exposed wire SHALL be repaired.

(11) Electric fans, papercutters, and other hazardous equipment SHALL be placed where they are no hazard.

(12) All hazardous belts, gears, pulleys, rotating parts on office machines SHALL be guarded.

(13) Window sills and ledges SHALL be free of loose objects.

(14) Matches, cigars, cigarettes, and pipe heels SHALL be dead out when disposed of. Wastebaskets should not be used as ashtrays.

(15) Broken glass SHALL be wrapped, marked, and put aside (not in wastebasket) for the janitor.

(16) All percolators and hot plates should be placed on asbestos or equivalent when in use.

(17) Extra precaution should be taken in disposing of fluorescent tubes to prevent accidental breakage.



HSC 3.2  
TO 8.6

## 8.42 RECOMMENDED OFFICE PRACTICES

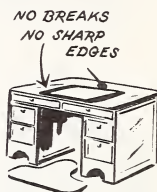
(1) Floors should be treated with nonskid wax.

(2) Small rugs should be provided with nonskid backing.

(3) Glass desk tops should not have breaks or sharp edges.

(4) Safe lifting practices.  
See HSC 8.62.

(5) Ladders should be used to reach top shelves instead of makeshifts like chairs and boxes.



(6) Regular paper fasteners should be used; never pins. Razor blades and pins should be kept in containers, never loose in desks or thrown in waste baskets.

(7) First aid kit should be available for treatment of all scratches and cuts to prevent infection. See First Aid Guide.



(8) Furniture should be frequently examined for splinters and weakened or broken parts. Furniture needing repairs should be placed in nonuse status.

## 8.43 HOT WATER SAFETY

(1) Hot water tanks SHALL be equipped with a safety relief valve if a check valve prevents the hot water from backing into the cold water main or if there is no expansion tank.



## 8. 43(2)

8.43 (2) The pressure at which a safety relief valve is set to operate SHALL NOT be in excess of the maximum allowable working pressure of the tank.

(3) There SHALL be no valve or other obstruction between the safety relief valve and the tank; the discharge opening SHALL be the full size of valve opening; and the safety valve SHALL be so arranged that no one will be scalded by its discharge.

## 8.44 GAS, OIL, AND KEROSENE SPACE HEATERS

(1) All gas or fuel oil space heaters installed in sleeping quarters SHALL be vented. In other structures, heaters SHALL have vent pipes connected with an approved flue or pipe directly to the outside of the building, unless they are approved by the National Board of Fire Underwriters for unvented use.

(2) Rooms, including lookout cabs, heated with kerosene-wick-type space heaters SHALL be ventilated to avoid illness or death from improper combustion of noxious gases.

(3) Gas-burning equipment SHALL bear the approval seal of the American Gas Association Laboratories. Equipment SHALL have an automatic shut-off which will cut off gas supply to the appliance including the pilot, in case the pilot flame goes out.

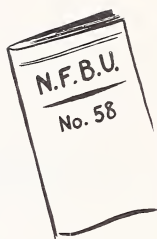


Vents should be used for all gas-burning appliances. They SHALL be used for thermostatically controlled domestic appliances with an input rating of over 5,000 BTU per hour.

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Storage containers and piping SHALL conform to the requirements of National Board of Fire Underwriters Pamphlet No. 58, The Standards for the Storage and Handling of Liquified Petroleum Gases.







## 8.5 REPAIR SHOPS

### 8.51 GENERAL

(1) Machines SHALL NOT be cleaned, lubricated, adjusted, or repaired while operating or in motion.

(2) Machinery SHALL be repaired only when there is sufficient light to see clearly.

(3) An "Out-of-Order" warning sign, showing when, why, and by whom, SHALL be posted until repairs are completed. When special dangers are involved, the switch SHALL be locked in the off position; for battery-operated equipment, the ungrounded cable SHALL be removed from the battery post.



(4) Equipment that is supported by slings, hoist, or jacks for repairs SHALL be blocked or cribbed before men are permitted underneath for any purpose.

(5) When repairs are made on conveyors, cableways, etc., far from the source of power, removal of fuses, disconnecting battery cables, blocking, or other such devices SHALL be used to prevent starting.

(6) Blocking material should have wide parallel flat surfaces. Stage blocking SHALL be as nearly perpendicular as possible.

(7) Metal pedestal supports SHALL have sufficient base and top area to safely support loads without danger of tipping over.

## 8.51(8)

8.51 (8) When repairs or other work are completed, a check SHALL be made to see that everyone is in the clear before equipment is started.

(9) Repairman should have at least one man assisting him when he is working on heavy equipment in the field.

(10) Workers SHALL stay a safe distance from moving machines so that clothing and handtools, SHALL NOT be caught.

(11) Cranks for all gas engines SHALL be so mounted that they cannot fly out and strike operator.

(12) When hand cranking any gasoline engine, operator SHALL--

- a. Retard spark, if adjustable.
- b. Get safe footing.
- c. Be sure fingers are clear when cranking.
- d. Use safety grip, thumb not around handle.
- e. Pull through top quadrant only.
- f. Never spink crank.



(13) When using rope or cable starters the operator SHALL--

- a. Make sure of proper clearance.
- b. Not wrap rope or cable around hand or wrist.
- c. Keep rope or cable equipped with proper handle.
- d. Use correct size rope or cable in good condition.

BLDGS. AND GROUNDS

REPAIR SHOPS

## 8.52 CAR SERVICING AND REPAIRS

(1) Cars SHALL be maintained in accordance with state motor vehicle laws and Forest Service equipment safety and maintenance standards.

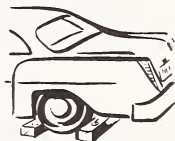
(2) All electric power-operated equipment, including portable electric handtools, SHALL be maintained in good repair, with particular attention to electrical grounds, connections, and insulation.



(3) Operator SHALL be cautious when using electrical equipment under wet conditions, such as when washing cars or when vehicles are on wet floor or ground.

(4) Hydraulic lift SHALL have sign posted warning "All persons stand clear of hoist while it is being raised and lowered." Hydraulic lift SHALL have safety lock or other device to prevent accidental lowering. Such lifts SHALL be signed calling attention to use of the safety lock.

(5) A grease pit below floor level SHALL NOT be used unless it is mechanically ventilated and provided with an exit. Plank ramps or power hoists and blocking are preferred.



(6) If pits are used, they SHALL be kept free of oil, grease, rags, and fumes, and SHALL be provided with guardrails or a cover, whether inside or outdoors.

(7) If car being repaired or serviced is not jacked up, brake SHALL be applied and the wheel blocked to prevent car from rolling.

8.52(8)

8.52 (8) Lock ring SHALL be in correct position when tire on vehicle is inflated. Personnel SHALL stand on one side when tire is inflated.



(9) When inflating tire which is removed from vehicle, lock ring side SHALL be either down or against wall.

(10) All tire repair servicing stations should have safety chain or tire rack device to prevent possibility of injuries from flying rims.

(11) Foot brake and clutch pedals on all automotive equipment should be covered with rubber nonskid foot pads to minimize possibilities of driver's feet slipping off pedals.

(12) BEFORE ANY WORK IS DONE OR ADJUSTMENT MADE ON THE CHASSIS OF A DUMP TRUCK WHILE THE BODY IS IN AN ELEVATED POSITION, THE BODY SHALL BE SECURED BY AN ATTACHED PROP STRONG ENOUGH TO PREVENT ITS ACCIDENTAL LOWERING. A SIGN CALLING ATTENTION TO THIS REQUIREMENT SHALL BE PLACED AT EYE LEVEL NEAR BOTH REAR CORNERS OF THE CAB. THIS SAME PRECAUTION IS REQUIRED WHEN OPERATING A LOAD LUGGER.



(13) Special care SHALL be taken when working on four-wheel drive vehicles and vehicles with non-slip differentials to assure that the vehicles do not move unexpectedly.

## 8.53 USE OF SOLVENTS

(1) Gasoline SHALL NOT be used for cleaning.

(2) Cleaning solvents SHALL have a flash point of 100° F. or higher.

## 8.54 BATTERY SERVICING--Caution: Recharging batteries generate explosive gases.

(1) Battery charger setup SHALL be in a well-ventilated area to avoid explosion of hydrogen released by battery.

(2) No exposed flame, spark, smokers' materials, welding, or gases SHALL be brought near a battery being charged or shortly thereafter.

(3) Battery acid SHALL be kept away from skin and clothing.

(5) In preparing electrolyte solutions, acid SHALL be poured slowly into the water. Water SHALL NOT be poured into the acid.

(6) All containers which have held electrolytic solution SHALL be thoroughly rinsed or disposed of promptly after being used.

## 8.55 COMPRESSORS

(1) All tanks, excepting garage type, using over 80 pounds pressure SHALL be tested and stamped in compliance with the ASME Code and SHALL show that they conform with State laws. Any tanks not so stamped SHALL be given a hydrostatic test to 25 percent over maximum operating pressure. Date of test SHALL be permanently marked on tank.



8.55 (2) A thorough monthly inspection SHALL be made for leaks. Any found SHALL be corrected immediately. In such cases replacement is preferable to repair.

(3) The brass fusible plug SHALL NOT be replaced with an ordinary pipe plug.

(4) Airfilter screens SHALL be cleaned in crankcase oil, NOT in solvents, kerosene, or gasoline.

(5) Compressor valves SHALL be removed for cleaning. Carbon may be loosened by soaking valves overnight in solvent, but they SHALL be absolutely dry before re-installing them. Valves SHALL NOT be interchanged. When valves are removed, pistons or heads SHALL NOT be cleaned with solvent or kerosene at any time.

(6) All pressure tanks or lines SHALL be provided with safety valves, with air-pressure gauges, and with drain cocks at the lowest point on the tank or at any low point in the line. If one of them is defective, it SHALL be replaced, not repaired.

(7) Safety valves SHALL be checked to make sure they unload at the rated safe capacity by holding unloader arm to build up pressure to safety valve setting.



(8) Unloader mechanisms are set to maintain a pressure of 85 to 90 pounds. If they stick or get out of order, repairs SHALL be made by a competent mechanic.

(9) Garage compressors SHALL be drained once a week during heavy use, once a month during light use. They SHALL be tagged accordingly.

## 8.56 STEAM HOSE

### (1) Operator SHALL--

- a. Wear rubber boots and apron reaching below boot tops.
- b. Grasp hose firmly close to nozzle to prevent whipping.
- c. Point nozzle to floor before opening valve.
- d. Turn on water first, then turn on steam.
- e. Turn off steam first, then turn off water.



8.57 MONOXIDE GAS--This gas is odorless, colorless, and tasteless. It is a deadly poison, killing quickly without warning.

### (1) Employees SHALL guard against it at all times.

a. Operate gasoline motors in closed building only when ample ventilation is provided or when exhaust fumes are forced outside.

b. Provide interior ventilation by partly opened windows when driving vehicles.

c. Exhaust pipes and manifolds SHALL be located so fumes will not endanger the operator or other workers.

d. Connections to exhaust pipes and manifolds SHALL be tight enough to prevent fume leaks.



OPEN WINDOW



(2) Sufficient tail pipe SHALL be installed to keep exhaust fumes from swirling up into the truck.





## 8.6 WAREHOUSING

### 8.61 GENERAL

(1) Neatness and orderliness SHALL be maintained at all times

(2) Gloves or hand leathers and pads, leather or canvas aprons, and safety shoes SHALL be used when handling heavy or sharp-edged objects.



(3) When unpacking material, boards with nails SHALL be pulled or cinched. Nails SHALL be removed from opened boxes and kegs used for storage or material carrying.

(4) Piling instructions:

a. Safe floor load limits SHALL be observed. Heaviest items should be stored near walls, where floor joists have the greatest strength.

b. Each pile SHALL have a firm foundation.

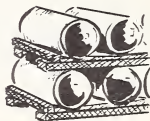
c. Round objects SHALL be blocked or bracketed so that they cannot roll.

d. Tiers SHALL be cross-piled or tiered so that materials support each other if possible.

e. Insecure tiers SHALL be interlocked with boards or other materials.

f. Material SHALL be piled only high enough for safe lifting, handling, and storage.

g. Material SHALL be leaned away from aisles to prevent toppling



8.61(4)h.

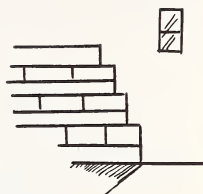
8.61 (4) h. Piles SHALL be broken down from the top, with step backs or taper maintained, and with no undercutting.

(5) Tools or materials SHALL be stored away from--

a. Unguarded windows where they might fall out.

b. Heat sources, if flammable.

c. Aisles, fire escapes, fire equipment, and electric switches.



(6) Grease, oil or paint rags, excelsior, paper, or other flammable material SHALL be placed only in metal receptacles, which should be emptied frequently. Wet excelsior and similar fibrous packing is conducive to spontaneous combustion and should be removed from the warehouse immediately.



(7) When hoist is used, load SHALL be secure; and workers SHALL be out from under load before it is lifted.

(8) Employees SHALL watch for pinch points, splinters, slivers, and projecting nails.

(9) See Safety Equipment, Handtools, and Ladders.

HSC 7.3

7.1

6.5

## 8.62 LIFTING

(1) Mechanical devices such as skids, rollers, hand and lift trucks, hoists, wheelbarrows, tongs, cant hooks, peavies, haypoles, and hand spikes SHALL be used to avoid injury.

BLDGS. AND GROUNDS

WAREHOUSING

a. Lift trucks and other lifting mechanical devices SHALL be operated only by authorized personnel.

b. Workers SHALL be given instructions in use of hand truck and dolly for moving equipment and supplies to eliminate hand lifting.

(2) Employee's immediate supervisor SHALL--

a. Be sure of worker's physical fitness to lift.

b. Give worker detailed instructions on how to lift.

c. Check frequently on lifting practices.



(3) Employee SHALL--

a. Get a firm grip.

b. Keep the body upright. He SHALL lift with the leg and arm muscles, not with the back and stomach.

c. Get a good footing. Crouch when starting to lift.

d. Take a deep breath and hold breath while lifting or lowering the load.

e. Test the load first. Lift gradually; avoid jerky motions. Keep the load close to the body.

f. Avoid twisting motions. Employees SHALL NOT shift positions of the feet while lifting, until he has raised the load.

g. ASK FOR HELP IF THE LOAD IS HEAVY. EMPLOYEES SHALL NOT TRY TO LIFT BEYOND HIS STRENGTH.

h. Check with supervisor to make sure the best methods of lifting are used, if in doubt how to handle material.

i. Avoid a foolish, show-off demonstration of strength.

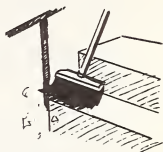


## 8.62 (4)

8.62 (4) The lifting limit SHOULD be 70 pounds for men, 25 pounds for women.

## 8.63 STAIRWAYS AND FLOORS

(1) All stairways, aisles, floors, working spaces, platforms, and exits SHALL be kept free from defects, rubbish, slippery substances, loose material, or obstructions that might cause falls.



(2) Handrails SHALL be used on hazardous stairways and platforms.

(3) All floors or wall openings where floor on other side is not at same elevation SHALL be guarded by railings, or barriers, or marked by paint if unsafe.



(4) Windows or other openings into elevator and hoist shafts, drying towers, etc., should be posted on the outside of the building to warn firemen forcing entrance into building.

(5) All passageways and stairs where slipping might occur should be painted with nonskid paint.

(6) Non-skid wax should be used where floors are waxed. Non-slip strips should be applied to certain lab floors to avoid falls where the hazard is great, i. e., dust, sawdust, etc.



## 8.64 MATERIAL HANDLING

### (1) Bagged material:

a. It SHALL be crosstied when piling.

b. Bag mouths should be placed toward center of pile.

c. Pyramid method SHALL be used when piles are higher than 5 feet.



### (2) Barrels, kegs, and drums:

a. If piled on ends, they should have planks between layers. Planking should be as wide as the bearing surface of the container.

b. If piled on side, first row SHALL be blocked to prevent rolling.

(3) Boxes and crates should be stacked on the side having greatest area, unless contents, such as crated glass, requires special handling.



### (4) Cartons loaded:

a. They should be piled with care, because sides are not rigid and will not support a heavy load.

b. They should be protected from moisture to prevent collapse.

(5) Cement should not be stacked more than 10 sacks high, to avoid heavy lifting and to prevent piles from tipping over. If practical, alternate sack layers should be cross piled.

### (6) Culverts, pipes, poles:

a. Crew SHALL lift, move, and lower object only upon prearranged signal of one member of the group.

b. Object SHALL be moved slowly, without sudden stops and starts.

8.64(6)c.

c. Carrying bars or tongs should be used if possible.

(7) Glass:

a. This SHALL be carried on outside of arm, with palm of hand facing outward and the other hand reaching across the body and grasping the glass on top.

b. Sleeves SHALL be buttoned around the wrists.

c. Arteries and wrists SHALL be protected by leather cuffs, when considerable amount of glass work is to be done.

d. Large panes SHALL be handled singly.

e. Glass SHALL be stored on edge, in places where workers cannot run against it.



(8) Grass, hay, straw, and baled excelsior should be stored in a separate building. Only what is needed should be taken into the packing room.

(9) Lumber: Leather-faced gloves and aprons should be worn by workers loading and unloading lumber and handling rough lumber.

8.65 GOOD HOUSEKEEPING--First Step in a Safety Campaign

This results in--

(1) Nothing to trip or slip over in office or field.

(2) No trash in or around buildings or work areas.

BLDGS. AND GROUNDS

WAREHOUSING

(3) Fire hazards controlled. Flammables in safe containers. Electrical wires and equipment in A-1 shape.

(4) Safe storage. A place for everything. Is everything in its place?





## 8.7 WOOD AND METAL SHOPS

### 8.71 GENERAL

(1) There SHALL be clear, adequate aisle and working space around machines, maintained in a nonslippery condition.

(2) All cutting tools SHALL be in safe condition. Defective tools SHALL NOT be used.

(3) A guard over treadle SHALL be provided on treadle-operated machines to prevent accidental starting.

(4) Before starting any power-driven machine, the operator SHALL check to see that--

- a. The working surface is clear.
- b. Guards and safety devices are adjusted in place.
- c. All parts such as cutting tools, tool holders, chucks, centers, guides, and clamps are firmly adjusted for the work to be done and are set to clear all moving parts.
- d. The machine is in safe operating condition, with all parts operating freely.

(5) Operators and all others SHALL stand out of line of feed of piece being machines or sawed. An operating machine SHALL NOT be left unattended.



8. 71(6)

8. 71 (6) Machines SHALL be stopped to oil, clean, or adjust them, and to change plates or cutters. Chuck wrenches and drift pins SHALL be removed as soon as work is adjusted.



(7) Sticks or brushes SHALL be used to remove particles, metal cuttings, chips, or dust from machines; never use the hands.

(8) Machinery SHALL be shut off immediately after completion of a work operation and before adjustments are made. The operator SHALL remain at the machine until it stops.



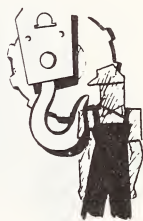
(9) Belts on operating machines should be replaced or shifted by means other than the hands. Machine should be operating at lowest possible speed.

(10) Belt dressing should be applied to the belt as it leaves the pulley.



(11) A chip guard SHALL be used when operating the chipper or lathe, if the material requires it.

(12) Support of overhead cranes SHALL be checked to be sure they can withstand the loads. Load limits should be posted.



(13) Employees without experience SHALL NOT operate any wood or metal working machine until instructed as to the hazards and proper operation of the machine, use of protective devices, and

SHALL demonstrate a satisfactory understanding of these machines in the presence of a qualified supervisor. HSC 7.3

## 8.72 WOODWORKING SHOP

### A. SHAPERS

(1) Sharper heads SHALL be protected by encircling guards above the knives, extending beyond sweep of longest knife, and adjustable to height of work.

(2) Knives SHALL be kept sharp.

(3) Before starting the shaper, the operator SHALL assure himself that the cutter-head assembly is securely tightened and locked to the spindle.

(4) Small pieces SHALL be held in jigs.

(5) In no case SHALL a warning device of leather or other material be attached to the spindle.

### B. JOINTERS

(1) Jointer SHALL be equipped with a guard consisting of a metal cover wider than table opening and covering all of the cutter head in front of the guide. A guard covering the cutter head back of, and traveling with, the guide SHALL also be employed.

(2) A jig or pusher stick SHALL be used when jointing short pieces.

(3) Material being jointed SHALL be held so that hand is not in front of the work at start of cut, or at back of the work at finish of cut.





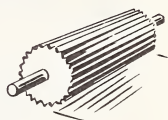
8. 72C.

## 8. 72 C. PLANERS, MOLDERS, STOCKERS, TEN- ONERS, MATCHERS, AND PANEL RAISERS

(1) Powered feed rolls SHALL be guarded to keep operator's hand from being caught between rolls and running stock.

(2) Corrugations of feed rolls SHALL be kept clean and sharp.

(3) Anti-kickback dogs SHALL be used in front of feed roll.



(4) An exhaust system should be used to take up chips.

(5) Outrunning end SHALL be kept clear and workers SHALL stay out of line of finished pieces.

### D. CIRCULAR TABLE SAWS

(1) Table-type saw guards SHALL include--

a. A hood covering saw at least to depth of teeth and giving a clear view of line of cut.

b. A spreader that is part of the guard.

c. An anti-kickback device, also a part of the guard.

d. Safe under-table protection.



(2) Guard SHALL be used except when it clearly interferes with some types of work and is therefore unsafe.

(3) Saw SHALL be used only for the type of work for which it is intended.

(4) Saw SHALL be installed and used only for designed speed.

(5) Saw SHALL be kept set and sharp, and arbor nut SHALL be tight.

(6) A pusher stick SHALL be used when narrow stock is sawed.

(7) The ripping fence SHALL NOT be used as a guide when crosscutting material.

(8) Cut control safety saws should be used if adaptable to the work to be done.

#### E. SWING CUTOFF SAWS

(1) The saw SHALL be kept set and sharp and the arbor nut SHALL be tight.

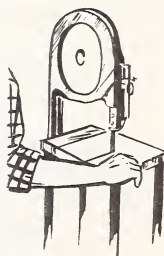
(2) The material to be sawed SHALL be free of loose knots, nails, etc.

#### F. BAND SAWS

(1) The upper wheel SHALL be turned manually before starting, to assure that the saw band will travel smoothly on both upper and lower wheels and through the band guide.

(2) All of the saw SHALL be enclosed except portion used in making the cut.

(3) If equipped with powered feed rolls, rolls SHALL be guarded.



## 8. 72F. (4)

8. 72 F. (4) The width of the saw band SHALL be as wide as the nature of the work will permit, but a wide saw band SHALL NOT be forced to cut on a small radius.

(5) All material being worked SHALL be kept in firm, full contact with the bed at all times. If material is of such size as to cause rocking on the bed because of overhang, supplemental supports SHALL be furnished.

## G. DRILLS AND BORERS

(1) Before starting the motor, the operator SHALL--

a. Be sure the drill is properly inserted and locked in the chuck.

b. Allow enough clearance to get the work between bit and table, and enough spindle travel to go through the work to the desired depth.

c. Material SHALL be clamped firmly to the bed, if difficult to hold it in proper position or alignment during drilling operations.

d. A wooden drill block used between the bed and the material being drilled SHALL NOT be less than 1 inch in thickness.



(2) Chucks for drills and boring bars SHALL have countersunk set screws so that there are no projections.

(3) Where counterweights are used, they SHALL be bolted to the bar.

## H. SANDERS

(1) Powered feed roll SHALL be guarded between roll and stock.

(2) An exhaust hood connected to an adequate exhaust system should be provided to remove dust.

(3) Manually fed sanders should be provided with work rests to give support for the work.

(4) Pieces too small to allow hands to be kept a safe distance from the work SHALL be clamped securely.

## I. WOOD LATHES

(1) Tool rest SHALL be set slightly below center, close to the face; too heavy cuts SHALL be avoided.

(2) A screen strong enough to hold a thrown head SHALL be furnished.

## 8.73 MACHINE SHOPS

### A. GRINDING WHEELS

(1) Grinding machines SHALL be securely mounted on substantial foundations.

(2) New wheels SHALL be properly mounted as a precaution against breaking. Grinding wheels SHALL NOT be installed to revolve faster than allowable for the particular type of wheel.

a. Clean the bearing surfaces of wheel, flanges, and spindle.

8. 73A. (2)b.

8. 73 A. (2) b. Make sure wheel fits spindle, neither too tightly nor too loosely.

c. Use washers of soft material between flanges and wheels.

d. Tighten spindle nuts just enough to hold flanges firmly in place against wheel.

e. Before turning on power, turn wheel over a few times by hand to be sure that it runs true and does not strike guard or work rest.

(3) Wheels SHALL be equipped with tool rests, safety hoods, and belt guards. Hoods SHALL extend beyond outside edge of the stone.

(4) The tool rest SHALL be adjusted as close to the wheel as possible without touching it, so that the object being ground cannot be drawn between the guard and the wheel. The rest SHALL be fastened at the center line of the wheel; never below.

(5) Before turning on power, guards SHALL be in adjustment.

(6) Goggles or eyeshield SHALL be worn at all times by worker using power grinder, unless grinder is equipped with safety glass shield.

(7) Signs stating that eye protection is required SHALL be placed above all grinding machines.

(8) Operator SHALL stand to one side of the plane of a rotating grinding wheel during the first few seconds of wheel's operation.

NOTICE  
DO NOT GRIND  
WITHOUT GOGGLES



(9) The work SHALL be applied gradually to a cold wheel, to warm up the wheel and reduce break-age.

(10) Operator SHALL grind on the sides of a wheel only when it is made for side grinding, and then only when the sides are not badly worn or when not much pressure is needed. Avoid striking the wheel on the side.

(11) A wet-type grinding wheel SHALL NOT stand partly in water when not in operation.

(12) Operator SHALL report immediately any grinding wheel that seems to be unsafe, or is operating improperly, such as vibrating excessively.

(13) Before leaving the wheel, the operator SHALL shut off the power. The operator SHALL remain at the machine until it has stopped.

## B. BUFFING WHEELS

(1) A guard enclosing one-half of the sides and perimeter, extending from 30° above horizontal of the working face, SHALL be installed on stationary buffing wheels.

(2) Goggles, or a face shield, SHALL be worn by workers using a stationary buffing wheel, unless it is equipped with a safety glass shield.

(3) Operator using a portable buffer SHALL wear a face shield and stand to one side of the wheel.



8.73C.

### 8.73 C. METAL LATHES, PLANERS, SHAPERS, MILLING MACHINES, ETC.

(1) The operator SHALL select a tool bit that is suited to the job and is in good condition and SHALL set it securely in the tool holder.

(2) Operator SHALL apply a wrench to work on parts only when they are not revolving. The wrench SHALL be removed before operation is started.

(3) Hand power only SHALL be used when putting chucks or face plates on lathes, tightening arbor nuts on milling machines, etc., or for removing them.

(4) Machine SHALL be stopped to adjust length of stroke on planer or shaper, to adjust tools, and to change or adjust the work, if the machine is not constructed for safe adjustment when operating.

(5) Hoist SHALL be used for lifting heavy chucks and swinging work in place.

(6) Clutch or motor switch SHALL be placed within easy reach of the operator from his operating position. Switches that control machines or a series of machines SHALL be locked when the machinery is stopped for inspection or repair.



(7) Tail stock, tool holder, and object being turned SHALL be tightly clamped before the power is turned on.

(8) Goggles or plastic shield SHALL be worn when starting or observing a cut and while working cast iron pieces.



(9) Operator SHALL file left-handed when filing close to chucks or dogs.

(10) Operator SHALL stop machine to change a cutting tool or to examine the cutting edge.

(11) Electric lathes using belts should be equipped with belt guards.

D. HYDRAULIC PRESSES. Flat or squared stock SHALL be provided for pressing and supporting parts worked on.

#### E. DRILL PRESSES

(1) Clamps, or a vise attached to the face plate, SHALL be used for holding short material, or when holes larger than  $3/8$  inch are being drilled. If the work should slip from the clamp, operator SHALL stop the machine before attempting to make any adjustment or repair.



(2) The drill SHALL be run at a safe speed and feed.

(3) When using hand feed, operator SHALL release pressure before point of breakthrough is reached.

(4) A file or scraper SHALL be used to remove burrs from the drill hole.

#### F. TRIP HAMMERS

(1) A safety device, to prevent accidental application of power, SHALL be provided. When making repairs or adjustments, a substantial wooden prop SHALL be placed under the hammer.



8.73G.

8.73 G. POWER PUNCHES AND SHEARS

(1) The machine SHALL be adjusted to suit the thickness of the material being processed.

(2) Die and punch SHALL be matched for size.

(3) Power SHALL be shut off when adjustments are made to the machine.

(4) An automatic safety device, to prevent accidental application of power, SHALL be provided.

6181.02 Health and Safety Code

# CHAPTER

# 9

## Health



Policy



Disease Control



Sanitation



## CHAPTER 9. HEALTH

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## 9.1 HEALTH POLICY (FSM 6182)

### 9.11 GENERAL

(1) The Federal employee health program is designed to provide for health service programs, but these SHALL be limited to on-the-job emergency medical and dental services, pre-employment and other examinations, referrals to private physicians and dentists, and preventive programs relating to health.

(2) The United States Public Health Service is authorized to cooperate in surveys and to make suggestions and recommendations on the institution of a program in any locality. The programs, however, SHALL be limited to localities where there are a sufficient number of Federal employees to warrant providing such services. This means that this type of program may never be available to the majority of Forest Service employees scattered over large geographical areas.

F. S.  
HEALTH  
SURVEY



(3) The Forest Service SHALL be interested in the health of its employees, not only as a matter of human welfare but also as a factor in effective management.

(4) An employee's health is an invaluable personal asset and SHALL be safeguarded.

(5) Most of the measures that will promote health are up to the individual, but the Forest Service SHALL have some responsibilities.

a. Employees SHALL be urged to take advantage of community health services, such as chest X-rays and diabetes tests.

9.11(5)b.

9.11 b. Employees SHALL be encouraged to take planned annual leave and supervisors SHALL schedule work accordingly. Foregoing vacations and recreation SHALL be discouraged.

c. Work supervisors SHALL urge yearlong employees to use approximately their year's accrual of annual leave each year. They SHALL take specific steps to determine when these employees wish to take their leave. Supervisors and employees SHALL come to an agreement in advance as to the most appropriate time. Supervisors SHALL set a good example by arranging for and taking their own annual leave.



d. Supervisors SHALL urge office workers to take exercise and physical conditioning.

e. Employees, especially those over 45, SHOULD NOT be assigned from an appreciable period of sedentary work directly to a strenuous job, such as fire fighting.

f. All employment officers SHALL employ only those physically and mentally fit for the job.

9.12 MEDICAL EXAMINATIONS

FSH 6181.51

(1) Employees, especially those over 45, should be urged to have annual medical examinations.

a. Employees enrolled in the Government Health Benefits Program should utilize their policies to the fullest extent. Medical treatment received as a result of a periodic examination is covered by these policies including cost of the examination.

As a rule policies do not cover an examination which does not reveal a need for some type of medical treatment.

(2) Official medical examinations SHALL be required under these circumstances:

a. Employees subjected to special strain or hardship, particularly on fire suppression (but not limited to this activity).



b. A medical examination for physical fitness for duty (after appointment) SHALL be made by a full-time Federal Medical Officer, if available.

(3) When no Federal Medical Officer is available, expense for examination SHALL be either at personal or Government expense.

a. Personal Expense:

1. Where employee shows signs of undue fatigue or physical incapacity but not to such an extent as to endanger Government property or personnel.

2. To determine fitness for retention (not endangering Government property or personnel).

3. Incident to appointment, reinstatement, restoration, or reappointment, except for restoration of returning veterans and employment of fire fighters.

4. If there is reason to question an employee's physical condition, he should be urged to undergo a physical examination by his personal physician.

5. The practices outlined in 9.12(3)a4 shall be mandatory if there is serious doubt than an employee is physically qualified to perform arduous work when such would be required. In this case, the doctor's report should be furnished to the supervisory officer.

9.12(3)b.

9.12 (3) b. Government Expense:

1. When circumstances indicate need for examination as a precautionary measure for protection of Government property or personnel, such as examination of fire fighter applicants.

2. Restoration of persons returning from military service.



## 9.2 DISEASE CONTROL

### 9.21 GENERAL

(1) Cases of mental illness SHALL be brought to the attention of the Field Personnel Officer. Such cases call for delicate and considerate handling and for psychiatric consultation as well as the usual medical consultation that may not be readily available in outlying areas.

(2) Alcoholism is more and more accepted as disease or illness rather than the result of lack of willpower or adequate moral standards. The work supervisor SHALL attempt to dissuade an employee from drinking too much.



a. In the early stages after a warning, disciplinary action for further excessive drinking will sometimes jolt an employee and help achieve correction.

b. For the chronic or near-alcoholic, medical attention SHALL be recommended. Leave with or without pay for treatment or hospitalization may be necessary. In serious cases the assistance of Alcoholics Anonymous SHALL be sought.

(3) Heart and circulatory ailments are the number one health problem in the Forest Service. They kill twice as many of us as accidents do, and they cause 42% of our disability retirements. For permanent employees who have recovered from heart illness, and who are not eligible for employee compensation or disability retirement, or if



HEALTH

DISEASE CONTROL



eligible for optional retirement, do not elect to retire, their work supervisors SHALL:

a. Discuss with them their condition and wishes as to assignments, to their old jobs or new ones for which qualified.

b. Consult with their doctors and Federal or designated physicians as to their physical capabilities and the safety of assigning them to such jobs.

c. If the doctors so recommend, the employees will be allowed to resume their old or similar duties if they wish.

d. They SHALL be reassigned, if they wish, to less strenuous jobs, if such are available and they are qualified. Assignment should be at the same grade if possible.

e. No employee who has had heart illness and has recovered SHALL be involuntarily reassigned unless the above procedures have been followed and the reassignment is the only solution.

(4) Employees should watch for these warning signals and see their doctor if any of them persists--

Dizziness.

Indigestion.

Leg Swelling.

Shortness of Breath.

Awareness of Heart Beat.

Pain in chest on exertion or excitement.

If any of these symptoms are acute, persistent, or recurring, employees need examination and diagnosis.

Other trouble breeders are overweight, either seasonal or progressive through the years.

Sudden physical exercise after periods of relative inactivity. Diet may be



important. Talk to your doctor about the kinds and quantities of food that you eat.

(5) When an employee gets chest pains--

- a. Immobilize the victim at the first sign of pain.
- b. Have him stop and rest.
- c. Don't let him try to fight it or work it off.
- d. When the pain subsides, get the victim to a doctor as soon as possible.
- e. If the pain persists, he should be moved to a doctor anyway. The risk is greater if he doesn't see a doctor at once.

(6) Employee should follow these rules--

- a. Walk, don't run, up stairs.
- b. Don't eat too heavily at any one meal.
- c. Don't get overtired.
- d. Relax completely for 10 minutes twice a day.
- e. Keep weight normal.
- f. Keep out of arguments.
- g. Don't worry.
- h. Choose sports in which winning is secondary, and light relaxation and activity foremost.
- i. See your physician regularly.

(7) Work supervisors SHALL take steps to see that facilities are provided to ease the physical strain on individuals who spend an appreciable time operating equipment over rough roads or terrain, and may be subject to lame backs and kidney or bladder disorders.

**YOUR BEST  
EXERCISE --  
PUSHING AWAY  
FROM A  
LOADED TABLE**







## 9.3 SANITATION

### 9.31 GENERAL

(1) Work supervisors SHALL see that employees living in Government camps or quarters maintain a reasonable standard of personal cleanliness, which includes personal housekeeping as well.

(2) Work supervisors SHALL, first of all, set good examples in personal cleanliness.

(3) Health and sanitation surveys SHALL be conducted. Assistance of the United States Public Health Service and State and county health service personnel should be sought.

### 9.32 DRINKING FACILITIES

(1) All water supplies, particularly surface sources, SHALL be suspected of being contaminated until tested even though they originate from uninhabited areas. FSH 5652.31

(2) Prior to use and as often as needed, each water source used in connection with a Forest Service administrative site or recreation area SHALL be tested for purity in conformance with local public health standards, or in their absence, Forest Service standards, to insure a continuous safe water supply.

(3) To the extent possible, all developed sources of water SHALL be protected from potential contamination.

9.32 (4) Surface water not safe from contamination SHALL be used only after complete treatment as prescribed by competent authorities.

(5) Unsafe water supplies SHALL be condemned and plainly marked as unsafe for human consumption. Positive steps SHALL be taken to make such supplies unavailable by turning off, sealing, disconnecting, or diverting the water supply. Such precautions SHALL be maintained until necessary corrective measures result in an acceptable water supply.



(6) WELLS SHALL BE CLEANED ONLY BY QUALIFIED PERSONS. BEFORE DESCENDING, THEY SHALL USE CANDLE OR CANARY TO TEST WELL FOR POISONOUS GASES. WELL CLEANERS SHALL WEAR A SLING WHEN IN THE WELL. THEY SHALL ALWAYS HAVE A LOOKOUT HELPER AT THE SURFACE.

(7) Purification of water in emergencies SHALL be accomplished by using an appropriate form of chlorine, Chlorazene, or Halozone tablets, or by boiling the water for 10 minutes.

(8) Drinking water SHALL be obtained from safe sources and dispensed in individual sanitary containers such as paper cups if fountains are not available. Canteens SHALL be sterilized after use.



(9) When milk is provided for drinking purposes, it should be purchased in sealed bottles or cartons. Otherwise it SHALL be pasteurized (150° F. for 30 minutes) or boiled for three minutes.

### 9.33 CAMP SANITATION

(1) When authorized by the officer in charge, all burnable refuse should be burned.

(2) At temporary camps where flyproof covered garbage pits are not justified, a hole SHALL be dug and refuse kept covered currently with dirt.

(3) At permanent camps a covered garbage pit SHALL be provided for refuse which cannot be burned. Garbage containers SHALL be provided with lids and should be emptied and cleaned daily. When practicable paper or plastic liners should be provided.

(4) All garbage pits should be located below the source of water supply at least 50 feet from streams and the camp, and 100 feet from the kitchen.



(5) During fly season, kitchen, mess room, toilets, and garbage pits SHALL be treated frequently with chloride of lime, DDT, or other suitable insecticide.

(6) Permanent pit toilets SHALL be of flyproof and rodentproof design.

(7) Temporary pit toilets SHALL be maintained daily by sprinkling the pit with dirt, ashes, or lime and spraying with insecticide. Fire camp bedding grounds SHALL be provided with latrines.

(8) Pit toilets SHALL be located on the downstream side (and downwind to prevailing wind where possible) a minimum distance of 150 feet from the camp (sleeping quarters). Adequate lighting SHALL be provided connecting camp and toilets. Toilets

SHALL be properly supplied with sanitation materials. Lime should be applied to the pit on the basis of use with a frequency of once per day followed by an application of dirt or sand. FSH 2 5652.1

(9) Disposable plates, cups, and eating utensils should be used when possible.

(10) After use, regular dishes and utensils SHALL be thoroughly washed with hot water and detergents or soap, and then immersed for two minutes in scalding water, 170° F. or hotter, or boiled for one minute. Dishes SHALL be air dried.

(11) All camps SHALL be kept in sanitary condition by--

a. Maintaining a clean supply of free towels and toilet paper at all times.

b. Shaking and airing bedding each week.

c. Keeping personal effects clean.

d. Keeping cabins and tents clean and sanitary.

e. Keeping subsistence supplies carefully stored and protected from weather, flies, and rodents.

#### (12) Food Rations

a. If there is any doubt about the usability of canned rations or other food, they SHALL be destroyed. Food that is abnormal in appearance, taste, or odor SHALL NOT be eaten.

b. Meat component cans of C, K, and similar rations SHALL be destroyed if not used within 5 years after packing date.





c. All persons issued canned food for fire fighting or any purpose SHALL check packing date if available and closely examine contents before eating.

d. At storage facilities, cases of C rations under 3 years old SHALL be inspected at least once a year for spoilage.

e. At field camps or other points of consumption, rations to be issued SHALL be thoroughly inspected if rations are 3 to 5 years old, or if there is evidence of damage or spoilage regardless of date of pack. Spoilage criteria are leaky, severely rusted, swollen, weakened, or dented cans, and contents with a flat, sour taste or mold growth.

(13) Prospective campsites should be inspected for poison oak, ivy, or sumac, poisonous insects, and snakes.



(14) Showers, including foot racks and mats, SHALL be kept clean and disinfected.

(15) All corrals adjacent to occupied buildings SHALL be sprayed with insecticide.

#### 9.34 CERTIFICATION OF FOOD HANDLERS

(1) Where neither the State nor the local community requires medical certification, no one SHALL be employed or assigned as cook or food handler, except in an emergency, without prior certification by public health authorities or a competent physician that he is free of communicable disease for purposes of handling food.

(2) Additional examination and certification SHALL be obtained if there is reasonable doubt of a food handler's continued freedom from communicable disease.

(3) Any existing local laws or higher standards covering food handling SHALL be obeyed.





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**S**ize up your situation

**U**se your safety instructions

**R**emember to protect others

**E**stablish a margin for safety